ELECTRICAL REVIEW

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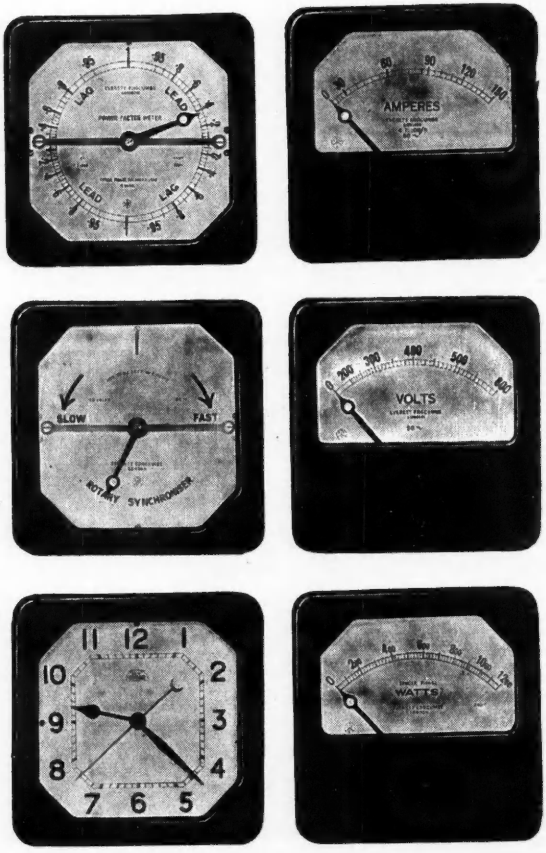

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THE OLDEST ELECTRICAL PAPER

ELECTRICAL REVIEW

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15th APRIL, 1949

Budget Proposals

SMALL RELIEF FOR INDUSTRY

EVERYBODY must share the regret of the Chancellor of the Exchequer at his inability to present "a more attractive picture" in his Budget speech. As it is, rising costs of government, largely due to expenditure on social services and defence, have dissipated the surplus realized last year and the Chancellor's figures for 1949-50 allow for a very narrow margin of revenue over expenditure.

But with full realization of the adverse circumstances which Sir Stafford Cripps is facing it is still permissible to criticize some of his decisions in the hope that when conditions improve he will devote early attention to remedying them.

It is only fair in the first place to welcome the concession to industry represented by the doubling of the initial income tax allowance in respect of new plant and machinery. Actually, as the whole cost is eventually allowed over the life of the plant, the overall result shows no difference, but, as Sir Stafford explained, the affording of earlier relief makes more money available for re-equipment at an earlier date.

Taxation of Profits

The Chancellor's promise to investigate the position with regard to the taxable profits of industrial undertakings is welcome although he insisted that there could be no reduction in the total tax taken from industry.

Now to turn to the unattractive side of the Chancellor's picture. Protest must first be made against the increases in telephone charges, not so much because they are an additional burden as because they represent the extension of a thoroughly bad principle. There is no suggestion that the telephone service is losing money. It is in a "sellers' market" with large arrears of work.

The excuse for the raising of charges is that it may curb excessive demand. However that may be, it is an example of the employment of a State trading concern as an instrument of policy and source of general revenue, which is just what opponents of nationalization have always feared. It is true that the Post Office is actually a Government Department but the idea is one which could too easily be applied to other nationalized services.

No Purchase Tax Remission

Continued "disinflation" being necessary, there was little hope of reductions in purchase tax but there was scope for adjustment within the present total receipts. It is disappointing that Sir Stafford Cripps has ignored the cogent representations of the industry for a reduction in the 100 per cent tax on electric water heaters. These appliances are not luxuries any more than are kettles and cookers, which escape the imposition; and they are not just switched on at peak times, as fires are.

Moreover it is most unjust that they should be treated differently from gas water heaters which bear tax at the rate of only 66⅔ per cent. We say "only," but that rate is too high as the gas people have pointed out. We hope that the last word has not been said on the subject; it is quite possible, and not unusual, for alterations in purchase tax to be made

by the Department at any time. Traders will be glad to learn that consideration is to be given to the problem of tax on stocks held at the time of any purchase tax reduction although the question does not arise in connection with this Budget.

The country is left with the impression that taxation is unlikely to be reduced for years, if ever. The only hope seems to be the cutting down of armaments and Government expenditure—a remote hope in spite of the Chancellor's proposal to put the brake on the amounts spent by the various Departments.

GAS TURBINES

NEITHER the diversity of gas-turbine research nor the amount of development now proceeding in this country has been overemphasized. How wide is the sphere in which the subject has created keen interest is shown by the composition of the committee which has been set up, as announced on another page, by the Ministry of Supply to keep the matter continuously under review for the purpose of guiding further work of these kinds. Sir William Stanier, chief mechanical engineer, London Midland Region, British Railways, is the chairman of the committee and one of its twenty-two members is Sir Frank Whittle, pioneer of the jet engine. The B.E.A. and the G.P.O. have one representative each.

METER PARASITICS

IT is not at all easy to form a clear mental picture of the way in which parasitic forces act to cause excessive wear, in addition to rotational wear, of the bearings of induction watt-hour meters. Both makers and users will be grateful to Mr. G. F. Shotter for clarifying the underlying phenomena in the way he has done in his I.E.E. Measurements Section paper. His pretty experimental determination of their origins has enabled thirteen forces to be so analysed as to suggest means of reducing the more destructive ones to a degree that should avoid vibrational movement between pivot and jewel in the lower bearing. Not only is guidance given for the future, but we have also been shown how to improve some existing types of meters without needing seriously to modify their design. This paper, which is a précis of the E.R.A. report T/T. 46, represents one part only of considerable meter research which, in co-operation with the E.R.A., has occupied the author for some years.

TENDERING PERIODS

WE recently referred to a complaint by the Electrical Contractors' Association of the inadequate time allowed for the preparation of tenders for electrical work and plant. The appropriate professional bodies were approached on the subject and the Association of Consulting Engineers responded by asking what the contractors considered to be a reasonable time for small and large contracts. The E.C.A. Council recommended that not less than fourteen days should be allowed for the preparation of a complete tender for electrical work, extended to a month where quotations for special machinery had to be obtained from manufacturers.

SECURING CANADIAN TRADE

CANADA is willing and anxious to buy British goods, but there are stipulations which must be met if trade is to be successful. Thorough study of the market is, of course, the first essential to ensure that the right kinds of goods are offered. Then there must be representatives in the market capable of talking intelligently to customers and, where necessary, satisfactory "service" arrangements. All this is not easily achieved by the manufacturer with small resources and it was pleasing to hear from Sir Harry Gilpin (leader of the recent Engineering Mission to Canada) that a suggestion for combined industry representation had been sympathetically received by the President of the Board of Trade.

WASTE PAPER COLLECTION

THE prospect of more paper for newspapers promises more salvage for the board and wrapping paper mills. But this will be the case only if people collect their discarded papers. The need for salvage is as great as ever, as the Waste Paper Recovery Association stresses in its annual report. This shows that over 100,000 tons more was collected last year than in 1947 and the hope is expressed that a further increase will be achieved this year. If it is the total will amount to 850,000 tons, which approaches the record figure of 1942.

Discharge Lamp Auxiliaries

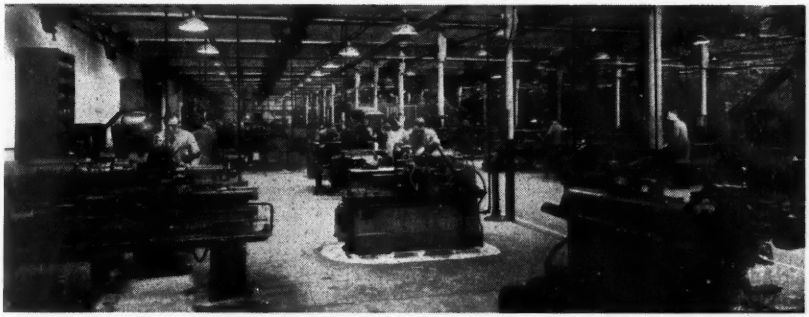
Production of Chokes and Transformers

By J. G. WELLINGS, M.I.E.E.*

ONE of the factories more recently established by the British Thomson-Houston Co., Ltd., is at Nelson, Lancashire. It is devoted entirely to the manufacture of chokes and transformer apparatus for use with electric discharge lamps (including tubular fluorescent) as a self-contained unit complete with all services. It has an area of about 136,000 sq ft and a potential output of over one million chokes per annum.

The B.T.H. Co. not only makes all chokes and transformers for its own lighting business, but supplies them to a number of other companies.

Practically all the components are made in the factory, with the exception of mouldings and casings. An extensive tool room also exists for the manufacture of dies for the punchings and jigs and fixtures.



Tool room at B.T.H. choke factory

The large output involved and the general nature of this business caused the layout to be planned for the three-fold requirement of line production on the most economical basis of items of standardized design; rapid production in relatively small quantity of items of special design; and the development of prototypes of new designs.

Standard "Mazdalux" lamp auxiliary gear manufactured at Nelson includes cubic and elongated chokes for 15, 20, 30, 40 and 80 W fluorescent lamps; chokes for high-pressure mercury vapour lamps of 80, 125, 250, 400, 650 and 1,000 W ratings; transformers for sodium vapour lamps of 45, 60, 85 and 140 W ratings; high-frequency chokes for fluorescent transport lighting up to 1,500 c/s; starting transformers for use with instant-start fluorescent lamps; and auto-transformers for the operation of certain fluorescent lamps on 110 V circuits.

Cubic chokes (type MRE) consist of a conventional core and coils within a steel case, compound filled, with a flush-mounted terminal block having fully shrouded contacts.

Elongated chokes (type MRF) are of unique design with core and coils fully covered by British patent No. 578248. Essentially, a long, narrow core has multiple limbs set transversely to the length, each limb having an air-gap at the centre. Coils on each limb are all connected in series. The polarity of alternate coils is reversed so that the magnetic flux passing up one limb returns down the adjacent limbs. The merits of this construction are the absence of leakage flux and the very low sound level

* *B.T.H. Instrument Transformer Engineer.*

which is otherwise difficult to achieve with a long shape of choke. The core and coils are contained within a long rectangular tubular casing, compound filled and closed at either end by mouldings which also serve as terminal blocks with fully shrouded contacts.

Type MRG chokes for use with high-pressure mercury vapour lamps consist of a conventional core and tapped coils contained within a die-cast casing, compound filled and incorporating a terminal block which is not only flush with the outside contour of the case, but is also so positioned as to minimize condensation trouble.

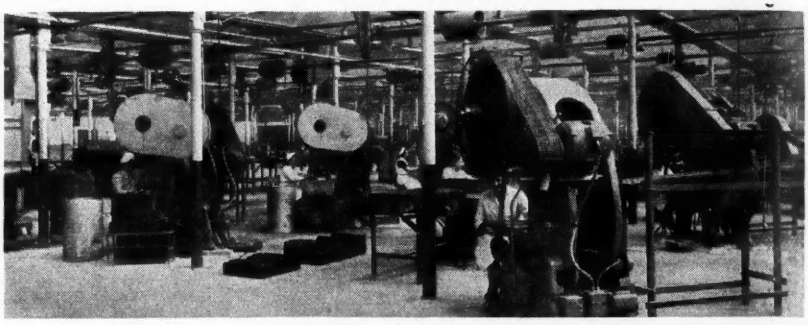
Type MRH chokes employed for high-frequency fluorescent lamp circuits are very small, and consist of core and coils in a moulded compound case in which the terminal inserts are directly mounted. The non-metallic case enables a very low sound level to be obtained which is otherwise difficult with high-frequency ratings.

Transformers

The sodium vapour lamp transformers (type MCG) employ a core and coils so arranged that high reactance is accurately obtained with a single-piece punching specially shaped to provide the magnetic shunt both between primary and secondary sections of the winding, thereby eliminating the need for separate core members, thus ensuring constancy of characteristics in service and quiet operation. The die-cast casings are similar to those used for housing the chokes.

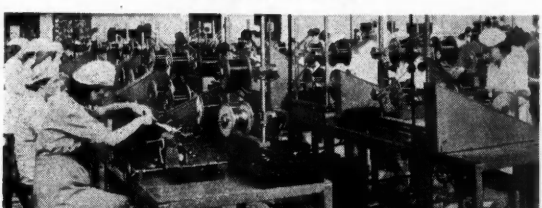
Auto-transformers (type MC) used for operating certain fluorescent lamps on 110 V circuits are designed on similar lines to those of the type MRF chokes, except that there is no air gap in the core.

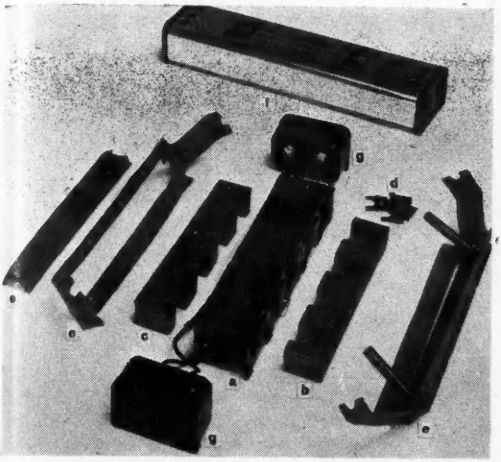
For elongated (MRF) chokes all core punchings are made on the premises by high-speed automatic presses with automatic feed and stacking. The coils are wound on machines with automatic layering and, by a unique arrangement of spools and mandrels, are wound in groups without break in conductor between coils.



Machines for making punchings for the laminated cores of chokes and transformers

Automatic coil winding





"Mazdalux" type MRF choke showing component parts (a) Five-coil unit. (b) and (c) Half cores. (d) Gap piece. (e) Insulated core clamp. (f) Case. (g) Terminal blocks

The chokes come to the main assembly lines in units of five coils with half the core already in position. The second half is then inserted with a gap between the two halves, which varies with the rating. The insulated core clamp ensures that the whole assembly is kept rigid.

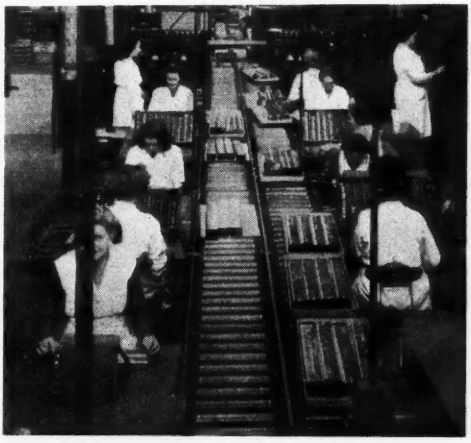
The core and coils are then subjected to preliminary test for characteristics, and, after baking, are inserted in the case and compound filled. The terminal blocks are then riveted in position and the choke is then complete, ready for its final test.

For checking the volt-ampere characteristics, special equipment has been designed and manufactured by the company whereby any error in setting is indicated on an instrument as a direct percentage. This equipment is self-compensating for any fluctuation in voltage and is independent of frequency. Manual operation of one button on the control board indicates the running current and another button the starting current characteristics, within limits of deviation. Greater accuracy and speed of testing is so achieved than by observation of separate ammeters, voltmeters and frequency meters. All chokes are also subjected to high voltage test, a red light indicating failure.

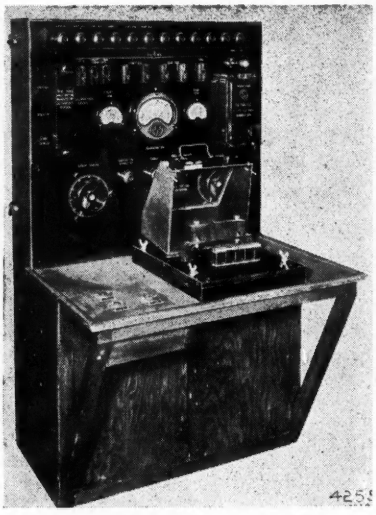
Equipment for checking the sound level of chokes has been exclusively developed and manufactured within the organization, there being no known prior work of this nature either in America or on the Continent. I have toured both those parts of the world to study designs and methods of manufacture employed by the leading companies in Europe and America. The equipment for the noise testing of chokes for fluorescent lamps is embodied in the flow line and accommodated within a booth to minimize extraneous noise from the factory.

Every production choke is checked against a "standard" previously calibrated by absolute means. Both are mounted for this purpose in a sound-proof box, and during testing they are in circuit with their lamp so that actual operating conditions are represented. This is of the greatest importance with chokes for fluorescent lamps, since the peculiar wave-form of current due to this type of lamp is the main cause of noise in a choke which has

Part of one of the assembly lines



not been designed for this condition. The sound level from the chokes in the testing box is amplified by electronic equipment to headphones worn by the test



Equipment for testing electrical characteristics

operator, and, by means of a change-over switch, very close and immediate comparison may be made between the two chokes. Any production chokes found to have a sound level exceeding that of the standard are rejected.

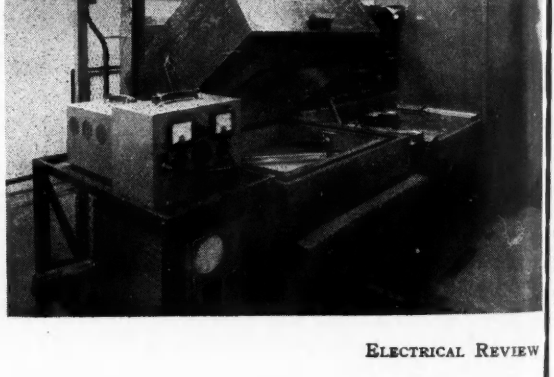
The standard choke is calibrated in the factory by absolute measurement with special equipment which, again, has been exclusively designed and manufactured by the company, and is capable of measuring down to a level of 10 phon. The average sound level of B.T.H. chokes is from 15 to 20 phon, measured at a distance of 6in away from the choke. Such sounds are practically inaudible to the normal ear, hence the need for amplifying equipment in order that reliable testing may be conducted.

Entirely separate facilities exist for the production of small quantities of special chokes and transformers. A part of the factory has been devoted to this work, and has its own means of rapidly making special punchings, windings, cases, terminal arrangement, etc. Because of the individual characteristics of this non-standard gear, special equipment is also provided for testing both its electrical and acoustical performances.

The area allocated to the development of prototypes of new designs is more in the nature of a laboratory. Since the test equipment in this section is also used for the testing of special chokes and transformers, it has been laid out on most generous lines, and includes a complete range of motor-generator sets capable of the closest regulation, so that all tests may be carried out under stable supply conditions. Control is such that working voltages from zero up to 20,000 V are obtainable; there is a frequency range from 25 to 1,500 c/s with up to 100 A. High voltages are used for testing cold cathode lamp equipment, and large current is used in connection with large wattage mercury vapour lamps.

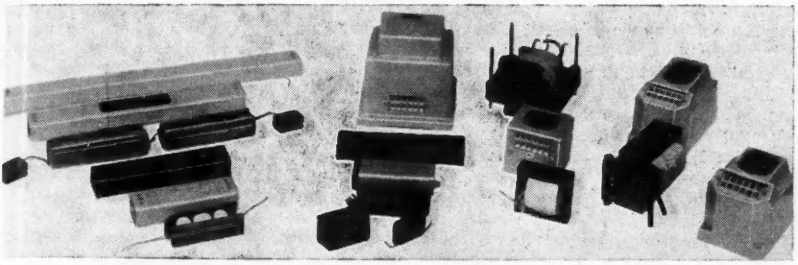
In every section of the factory emphasis is placed on the reduction of noise level in the equipment manufactured.

Soundproof room with test equipment in foreground



Therefore, one of the most important pieces of equipment in the prototype testing area is a large sound-proof room built with specially lagged walls. Facilities permit of not only individual lighting equipment being checked for sound level, but the testing of groups of equipment, even at high voltage, such as cold-cathode lamps many feet in length. Within this room also is the special sound-measuring equipment for the absolute calibration of standards used on production lines. In addition, there is provision for the life testing of chokes in large numbers, all of which can be left in operation with their respective lamps for long periods without interruption, daily checks being made by staff specially trained for the work.

Facilities are also available in this area for the testing of chokes under high ambient temperature. When chokes are mounted in fittings or enclosures without normal ventilation, overheating may result. To simulate such conditions of operation, wheeled chambers have been provided in which chokes may be mounted and placed either against any of the special testing benches for convenience of control, or wheeled into the sound-proof room for sound levels to be observed. The mobile chambers are fitted with heating units so that any desired ambient temperature can be obtained within the chamber and automatically maintained by thermostat control.



The many different types of chokes and transformers made in the factory

Although this factory is a complete unit, general engineering and factory control is vested in the Rugby organization, so that the whole facilities of the company are available to the Nelson factory.

Next Week's Events

Wednesday, 20th April

BRIGHTON.—Technical College, 6.30 p.m. I.E.E. Southern Centre. "The Testing, Reconditioning and Servicing of Domestic Appliances," by H. Hobbins.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. Film on "Atomic Physics."

MAIDSTONE.—Royal Star Hotel, 7 p.m. A.S.E.E. Kent Branch. "Water Heating."

MANCHESTER.—Engineers' Club, 7 p.m. A.S.E.E. Manchester Branch. "The Supervising Electrical Maintenance Engineer," by W. C. Ninnim.

Thursday, 21st April

CARDIFF.—South Wales Institute of Engineers, 6 p.m. Lecture on "Fundamental Factors in Industrial Recovery," by Sir Arthur P. M. Fleming. (I.E.E. members invited.)

DUBLIN.—Trinity College, 6 p.m. I.E.E. Irish Branch. "Impulse Testing and its Influence on Transformer Design," by W. P. Leach.

LONDON.—I.E.E., Savoy Place, W.C.2. 5.30 p.m. Kelvin Lecture on "Semi-Conductors and Rectifiers," by Prof. N. F. Mott.

Connaught Rooms, W.C.1. Diesel Engine Users' Association. Annual luncheon.

SHEFFIELD.—Royal Victoria Station Hotel, 7.30 p.m. A.S.E.E. "The Supervising Engineer in Industry," by A. G. Ramsey.

Friday, 22nd April

CARDIFF.—At the South Wales Institute of Engineers, 6.30 p.m. I.E.E. Cardiff Students' Section. "The Principles of the Metadyne," by E. J. Davies and R. A. Willford.

Connaught Rooms, W.C.2, 6.15 for 6.45 p.m. Junior Institution of Engineers. Annual dinner.

STAFFORD.—English Electric Co.'s Hall, 7 p.m. I.E.E. N. Staffs Sub-Centre. "Television Developments," by Dr. K. R. Sturley.

Saturday, 23rd April

LEEDS.—Electricity Board offices, Whitehall Road, 10 a.m. I.E.E. North Midland Students' Section. Sheffield exchange paper.

Views on the News

By REFLECTOR

MAKERS of electric water heaters are extremely disappointed that their request for the removal or reduction of purchase tax on their appliances went unheeded by the Chancellor of the Exchequer. Their opposite numbers in the gas industry are equally upset and Mr. J. R. W. Alexander, general manager of the British Gas Council, has expressed their regret in a forthright manner. After pointing out that the continuance of the tax is interfering with the provision of a social service and it puts the manufacturers of the appliances and their workers into a serious position, Mr. Alexander makes the thrust: "Alcohol has been preferred to cleanliness," which should touch our abstemious and austere Chancellor.

★ ★ ★

Although Hull's telephone service remains in the Corporation's hands local subscribers apparently do not escape the surcharge imposed upon telephone users in the rest of the country and it is feared that the increase will fall on them too. There seems to be no need for increased revenue for there was a profit of about £25,000 last year—but then the same applies to the Post Office telephone service.

★ ★ ★

I see from a report on the Commons Committee proceedings on the Bolton Corporation Bill that the B.E.A. successfully opposed a proposal that the Corporation should be able to set up "smokeless zones" in its area. It was stated for the Authority that it gave financial support to the National Smoke Abatement Society. To those who are regularly protesting against power station emissions this will look rather like a contribution to a police benevolent fund from a burglars' confraternity.

★ ★ ★

As a rule editors of the lay newspapers are content to publish without comment letters objecting to the erection of overhead lines in country districts and suggesting that it is only because of obtuseness or lack of æsthetic sense that electricity supply authorities do not use underground cables. I am therefore glad to see that the editor of the *Spectator* appends a footnote to a letter of this character in the 8th April issue. He points out that an overhead 132 kV line costs £6,500 a mile while the cost of underground cable varies from £56,000 to £80,000 a mile. The figures are those recently given by the Parliamentary Secretary to the Ministry of Town and Country Planning in the debate on the National Parks Bill.

★ ★ ★

I am glad to see that at last the limitations artificially imposed on the electricity supply industry are giving place to a more vigorous policy. Mr. H. Pryce-Jones, district manager of the S.E. Electricity Board, in a speech to electrical contractors at Brighton recently, said that future propaganda and advertising of the B.E.A. would be aimed at increased consumption outside the peak hours. Before very long he considered there would be great scope for all sections of the industry, and in "all" he included the contractors, with whom he looked forward to a prosperous partnership. He assured them that his Board had issued strict instructions to area managers regarding competitive tendering and was anxious to maintain the goodwill which had existed in the past.

★ ★ ★

It takes as much verbiage to relieve restrictions as to impose them. This observation is prompted by a perusal of the Electric Lighting (Restriction) Order, 1949, which, anyway, is a queer title for a "freeing" Order. Extremely precise bounds are set to the relaxation. The following will give a headache to any "barrow boy" who happens to see the Order:—

> "(2) For the purposes of the foregoing paragraph, the area for the time being illuminated . . . (c) in the case of a stall in a covered or uncovered market in which there is no general lighting, shall include, in addition to the area occupied by the holder of the stall, so much of any passage way (over which the public normally pass) between that area and the area occupied by the holder of an adjacent stall as is equal in width to three feet or to half the width of the passage, whichever is the less."

Atomic Power Production

FOR the last of this session's lectures arranged by the London Technical Group of the Electrical Power Engineers' Association, the subject chosen was "Atomic Power." In this DR. E. H. S. BURHOP, after outlining the theory of atomic fission and the problems entailed in the construction of chain-reacting piles, including protection from gamma rays, discussed the prospects of using atomic energy for the generation of electricity.

To find the equivalent influence on human affairs, he said, one had to go back 100,000 years to the first use and control of fire. The magnitude of its potentialities could be illustrated by the statement that one pound of fissile material could produce more than three million times the power of the same weight of coal. It was only the heat from the graphite moderator which slowed down the neutrons emitted during fission, that could be used for the bulk generation of electricity, and this heat at present was at too low a temperature (about 97.5 deg C) for practical use, although next year 100,000 kW would probably be made experimentally available in the United States and a relatively small amount in Great Britain. The temperature limit was set by the metal (aluminium) encasing the uranium rods in the pile, but materials would no doubt be developed that would not be unduly affected by temperature and would not absorb too many neutrons.

For meeting world requirements of energy of upwards of 3 million kWh/annum, about 150 tons of fissible U235 would be required, whereas only 10,000 tons of U238 was mined in 1939, of which the useful part was only 0.1 per cent. If "breeding" (establishment of chain reactions of neutrons) proved practicable, the known sources of uranium might last for seventy years, but if thorium could be used it would probably last for centuries. Ten years would be required to obtain 50 tons of U233 from thorium, and if the rate of its production could be increased by 10 per cent per annum, twenty to thirty years would be required to supply world power from atomic sources. This was on the assumption that all plutonium and U233 were used for power production and not for making bombs. Recent United States estimates of costs at the busbars based on a capital cost of atomic energy plant of $210/kW installed gave 0.77 cent/kWh at 50 per cent load factor and 0.48 cent at 100 per cent; these compared with coal-produced electricity at 0.75 cent and 0.57 cent. Atomic power should be regarded as supplementary to existing sources of power rather than as a substitute.

Gas Turbine Development

THE Minister of Supply has set up a committee to keep the industrial applications of the gas turbine under continuous review and to make recommendations to him as to any further research or development work which the committee thinks should be put in hand. Sir William Stannier has accepted the Minister's invitation to act as chairman of the committee, which will also include in addition to experts from Government Departments which are concerned with the subject, a number of independent members well-known in combustion engineering circles.

The first meeting of the committee was held on 5th April, when Mr. John Freeman, the Joint Parliamentary Secretary to the Ministry of Supply was present.

The composition of the committee is as follows: Sir William Stanier (chairman) (chief mechanical officer, London Midland Region, British Railways); Air Commodore Sir Frank Whittle (adviser on operation and development, gas turbine aircraft, B.O.A.C.); Professor O. A. Saunders (Professor of Mechanical Engineering, Imperial College); Sir Henry L. Guy (secretary, Institution of Mechanical Engineers); Rear-Admiral (E) D. J. Hoare (director of research, British Internal Combustion Engine Research Association); Dr. T. W. F. Brown (director of research, Parsons and Marine Engineering Turbine Research and Development Association); Mr. F. Shakeshaft (British Electricity Authority); Dr. D. T. A. Townend (National Coal Board); Mr. A. A. M. Durrant (British Transport Commission); Dr. F. M. Birks (British Gas Council); Sir Archibald J. Gill (General Post Office); Dr. H. Roxbee Cox (Ministry of Fuel and Power); Dr. G. A. Hankins and Dr. A. Parker (Department of Scientific and Industrial Research); Mr. A. E. N. Taylor (Ministry of Transport); Vice-Admiral (E) Sir Denys C. Ford and Dr. J. A. Carroll (Admiralty); Mr. J. Anderson and Mr. A. E. MacColl (Scottish Home Department); Captain (E) M. Luby, Mr. H. Constant, Lt. Col. P. E. Holmes and Mr. A. P. Wickens (Ministry of Supply).

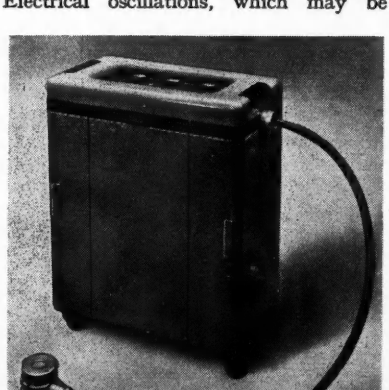
Ultrasonics

Possible Commercial Applications

By R. R. WHYMARK, B.Sc.
(Mullard Electronic Research Laboratories)

DURING recent years much intensive scientific research into the generation and properties of high-frequency sound waves has been performed. These waves, now usually termed ultrasonic waves, exhibit similar properties to those of ordinary audible sound, differing from them in the frequency at which the individual vibrations take place. For audible sound, the spectrum of frequencies concerned extends up to approximately 20 kc/s, while ultrasonic frequencies reach up to 500 Mc/s, corresponding to wavelengths of the same order of magnitude as those of visible light.

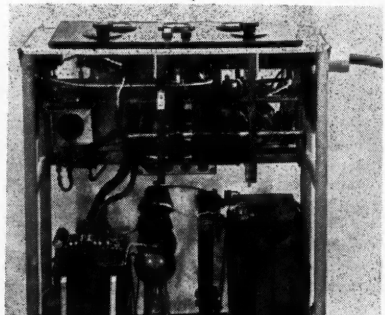
Sound energy in the latter frequency range may be generated by using the property of various materials to change their physical dimensions under the action of applied electric or magnetic fields. Electrical oscillations, which may be generated easily with thermionic valves, can be transformed into mechanical oscillations by exciting suitable materials at their natural resonant frequencies.



Mullard ultrasonic generator Type E.7562: shown right with cover removed

Probably the method most frequently used at the present day employs a piezo crystal as the vibrating element, whose amplitude of oscillation determines the ultrasonic output. For substantial outputs, high voltages must be applied to the crystal, which presents considerable technical difficulties if it is desired, as is often the case, to use water as the working medium. Such difficulties have been overcome at the Mullard Electronic Research Laboratories, which have produced, in addition to a suitable radio-frequency generator, a crystal holder capable of operation under water with working voltages up to 10 kV. Under such conditions, and in conjunction with the radio-frequency generator, ultrasonic outputs of approximately 350 W at 1 Mc/s are obtainable.

For the production of frequencies below 100 kc/s magnetostriction generators are usually used, wherein certain ferromagnetic materials are excited into vibration by alternating magnetic fields. Such generators are also under active investigation at the above laboratories, but have not yet been developed to the same



extent as the piezoelectric generators.

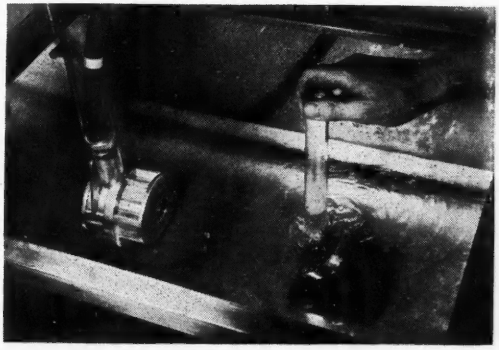
Ultrasonic waves possess two main properties not in evidence with audible sound waves, namely, the ability to "cavitate" a liquid (to form hollows in the liquid which, when they collapse, result in the exertion of extremely high instantaneous pressures) and the very high accelerations imparted to individual particles of the medium. It is probable that the many and varied effects of ultrasonic radiation are due in a large measure to a combination of such effects.

The possible commercial applications of ultrasonics cover a wide field, including dispersive, colloidal, coagulative, chemical and biological effects, and many others. A particularly promising field has been opened through the ability of ultrasonics to emulsify two normally immiscible liquids, such as oil and water. If two such liquids are placed one over the other and acted on by ultrasonics, an emulsion is quickly formed, which remains stable for long periods, indicating that a genuine colloidal solution has been formed. Such treatment easily lends itself to a continuous process, as opposed to the uneconomical batch process at present usually necessary for the emulsification of various commercial products.

The emulsifying action of ultrasonics is of importance in other connections. In the production of photographic emulsions, for instance, the homogeneity and stability of the emulsions used may be improved under ultrasonic treatment. The tendency for grains to agglomerate on the surface may be largely prevented and sometimes may be removed.

Metallurgists employ ultrasonics to keep certain alloys, not normally miscible in the liquid state, well mixed until solidification occurs. The finished product usually has a very fine structure. Further metallurgical uses concern the tendency for ultrasonic radiation effectively to remove dissolved gas from a liquid. Dissolved gas is always present in a melt to some extent, resulting in the formation of a coarse-grained material in which even definite hollows may exist. Continuous irradiation of the melt during processing has been found largely to remove traces of dissolved gas, once again giving the solid alloy a fixed structure.

The coagulative effect of ultrasonics is the reverse of the dispersive effects described above. If a dispersed system, consisting of solid particles in a state of fine division in a gas, be irradiated with ultrasonics, the individual particles tend to agglomerate very quickly into larger lumps which are precipitated. As a result it has been found possible rapidly to clear tobacco smoke and ammonium chloride mists. Such experiments lead to possible applications in connection with fog dispersal at airfields, removal of dust particles in coal mines, precipitation of smoke particles in furnace waste products and smoke clearance from the projector beam in cinemas.



Treatment of a sample in a test tube by immersion at the focus of a parabolic reflector

Under certain conditions solid particles suspended in a liquid coagulate rather than disperse under the action of ultrasonic radiation. In this connection, experiments have been performed from the commercial standpoint on the removal of unwanted particles from various liquids. In particular, in the brewing of certain beers it is of some importance to produce a clear brew free from suspended particles.

Considerable disruptive forces are at work in any liquid acted upon by ultrasonics. Probably to this can be attributed the effective cleansing action of the radiation. The laundry industry has

evinced some interest in this connection although it has been found, at the Mullard Laboratories, that fairly considerable powers are at present necessary to obtain a cleansing action comparable with that of ordinary methods.

For some years ultrasonic equipment has been commercially available for testing materials for internal defects, such as voids. Since all metals transmit ultrasonics to a marked extent, any changes in homogeneity of the material due to hollows or cracks will produce noticeable reflection of the sound beam. In this way extremely small defects may be located; a crack 10–5 cm in width may be detected.

The biological effects of ultrasonics are considerable and include the annihilation of some small forms of animal life. For example, under some conditions various types of bacteria can be rapidly killed, probably due to the very large differences in pressure resulting from cavitation tearing the cell membranes to pieces. An immediate application of this effect lies in the sterilization of milk wherein a continuous process of treatment could be substituted for the present batch process.

A whole series of different chemical effects have been observed by various workers, although, except in a few cases, trustworthy explanations of the phenomena are wanting. In general, it has been found possible to accelerate certain chemical reactions greatly and in some cases to produce chemical changes not normally possible. A commonly demonstrated effect is the rapid separation of iodine from an aqueous solution of potassium iodide containing some carbon tetrachloride. The fundamental reaction is thought to be between water and dissolved carbon tetrachloride, the potassium iodide being primarily an indicator of the oxidizing chlorine set free from the carbon tetrachloride.

Various practical chemical applications have been investigated, notably the maturing of whisky. The normal maturing time is of the order of 10 years, which can be considerably reduced with the aid of ultrasonic treatment. Definite results in this direction have already been achieved at the Mullard Laboratories. On the basis of the above considerations it seems that a wide and promising field of chemical research has been opened.

Service Agreement Dispute

THE Court of Appeal (Lords Justices Somervell and Evershed and Mr. Justice Wynn-Parry), on 5th April, dismissed the appeal of Electric Transmission, Ltd., from the judgment of Mr. Justice Romer on 12th November last, in its action against a former employee, Mr. Dannenberg. He dismissed the action which was based on an alleged breach of a service agreement.

According to the appellants' case the agreement provided that they should have the benefit of Mr. Dannenberg's inventions. One of these was a high-voltage fuse, but the appellants alleged that Mr. Dannenberg became director of a company which took over the exploitation of this invention, and that this was a breach of his service agreement.

Lord Justice Somervell said the appeal was mainly concerned with the clause of the agreement which stated that the inventor should be free to undertake research work outside his work for the appellants and the results should belong to him absolutely. The appellants contended that Mr. Dannenberg was under an obligation to disclose discoveries and improvements "in connection with such inventions" which remained during the life of the patent.

Mr. Dannenberg contended that the agreement was uncertain and unenforceable. His Lordship said his own conclusion was that the agreement was ill-drafted. One clause, for instance, was limited to the life of the agreement, and it would be inconsistent if, after Mr. Dannenberg had left the company's service, he had to surrender any further inventions that he made. He thought the appeal should be dismissed.

Lord Justice Evershed and Mr. Justice Wynn-Parry agreed, and the appeal was dismissed with costs.

Protection for Welders

EQUIPMENT for eye and face protection during welding is the subject of BS.-1542, which is complementary to BS.679 (filter glasses) and specifies dimensions, design features and materials to be used for making spectacles, goggles, face masks, helmets, hand-shields and screens, typical types being illustrated. Copies of the document are obtainable for 2s from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Watt-Hour Meters

RESEARCH INTO BEARING WEAR

A PAPER read before the Measurements Section of the I.E.E. last week by MR. G. F. SHOTTER (B.E.A.) describes research which has been directed towards clarifying the underlying phenomena of the parasitic forces that cause excessive wear, in addition to the rotational wear, of the bearings in induction watt-hour meters. The account falls naturally into two parts, the first summarizing the parasitic forces, of which thirteen have been analysed, describing the apparatus designed to observe the effects produced by the forces and the experiments made to determine the fundamentals of the phenomena, and presenting a formula derived from the experimental results.

The second part deals with investigations into the parasitic forces existing in various makes and types of modern single-phase meters, first by the experimental suspension method and, secondly, with normal bearings. It describes experiments made to determine how far it is possible to reduce some of the more destructive of these forces to a degree which will avoid vibrational movement between pivot and jewel at the lower bearing. This should be of use to designers, and when new designs are contemplated should lead to the production of meters that are free from vibrational wear and will in consequence have an extended service period.

Finally a brief description is given of the voltage and parasitic forces during "on-load" conditions, using the experimental suspension method.

DISCUSSION

During the ensuing discussion Mr. R. S. J. SPILSBURY (N.P.L.), said that it was necessary to emphasize the importance of parasitics, because many of the remedies which Mr. Shotter proposed—that the disc should be larger, the moving parts heavier, and the torque reduced—were against trends which were considered desirable on other grounds.

Apart from one, which could be reduced to zero, the parasitics did not vary over a wide range for the seven meters which the author had tested, and it would seem possible to reduce them to a low value without turning the meter inside out. It was to be hoped that the author would carry out further tests under actual working conditions and make a full investigation of the density and location of the currents in the disc; in that way it might be possible to reduce the parasitics to a satisfactorily low value without taking any retrograde step.

Wear Indicated by Noise

Mr. T. W. Ross (Metropolitan-Vickers), said that while meter engineers had known for a long time that vibrational forces had a serious effect on bearing wear, few of them had any knowledge of the components of these forces, so that the author's work in analysing them should help designers. The light reflection method employed by the author was very ingenious, and the speaker's company had used it experimentally.

Another way of assessing the wear on a meter bearing was by measuring the noise it emitted. They felt that if noise could be eliminated it would go a long way towards eliminating wear, and, therefore, his company introduced a spring-mounted jewel free to move in all directions so that the relative movement between pivot and jewel was negligible. This reduced the noise and life tests convinced them that it also reduced the wear. Despite what Mr. Spilsbury had said, he endorsed the author's remarks with regard to weight and disc size; the smaller the disc the greater would be the difficulties with parasitic forces.

Mr. M. WHITEHEAD (Ferranti) said that Mr. Shotter's investigation emphasized the interdependence of all the parts of an induction meter. In the end, it would probably be necessary for him to consider every part of the meter without exception.

Dr. G. F. TAGG (E.E.C.), warned manufacturers who might wish to use the author's ingenious experimental method that they might find some difficulty in doing so, because many factories were subject to a good deal of vibration, and unless the meter was mounted on a vibration-free support only the factory vibrations would be evident. He expressed interest in the effect of the parasitic forces on a ball-bearing meter. With a pivot meter, he pointed out, the pivot must slide over the jewel, but with a ball-bearing meter did the pivot slide on the ball or did the ball rock on the lower jewel? In the former case the ball bearing had no advantage, but in the latter it had, because the rolling wear would be less than the sliding wear. There seemed to be a distinct possibility that the ball rolled and did not slide.

Mr. L. B. S. GOLDS (B.E.A.) suggested that the author's work might result in the British meter being the best in the world. Figures given in the paper showed that already the amount of wear likely to occur in a British meter was considerably less than that likely to be obtained even in an American meter. The variety of designs had helped the author in his research work, as the study of the performance of various makes gave a clue to some of the parasitics likely to occur. That was an argument in favour of not too much standardization. A striking fact brought out in the paper was that no manufacturer had hit upon the combination of a tripolar voltage magnet system with two permanent magnets correctly polarized. There was need for higher accuracy with the polyphase meter and he hoped that the author would investigate that subject.

Balanced Drive and Brake

Mr. J. RIORDAN (Aron Electricity Meter) remarked that it was only recently that the important question of how the drive and brake torques should be applied to the disc of the meter had received proper study. The perfection of the kilowatt-hour meter was at present marred by the need to carry out periodic servicing, so that the present problem was not to extend the life of the meter but to reduce service charges by extending the periods between attention. It appeared that the disc was beset by complicated parasitics but fortunately the bulk of them could be arranged to cancel out, the remaining objectionable ones being parasitic B, tending to upset the disc, and H, which caused side-pull. The only complete solution would be balanced drive and balanced brake, but, Mr. Riordan said, before that could be achieved a vast programme of research was inevitable.

Mr. F. H. BATT, referring to the relation between noise and wear, said that the author had shown why in many cases a two-magnet meter was less noisy than a single-magnet meter. He suggested that there was a possibility of some of the remedies being worse than the parasitics.

Mr. A. R. MOWL said that while a reduction in voltage flux might be a means of reducing parasitic forces there was a limit to that which arose in a somewhat unexpected way. A small amount of vibration was probably useful in reducing static friction and enabling the meter to start with a very low driving torque.

Mr. M. STRUTHERS made some detailed comments on the parasitic forces and Dr. G. A. V. SOWTER asked whether Mr. Shotter had tried observing the vibrations with the aid of a stroboscope.

The author replied briefly.

Medical Applications of Electricity

A SOUTH-EASTERN and Southern E.D.A. Area sales lecture meeting was held at Caxton Hall, Westminster, on 6th April, when Dr. A. C. Boyle, M.B., B.S., M.R.C.S., D.Phys.M., gave a lecture on "The Medical Applications of Electricity."

Dr. Boyle, who was introduced by Mr. C. F. Wells, chief commercial officer of the South-Eastern Electricity Board, dealt with the applications of electricity in the

Mr. C. F. Wells introducing Dr. A. C. Boyle at last week's E.D.A. sales lecture meeting

diagnosis of disease, including X-rays, the electro-cardiograph, the electro-myograph, and the electro-encephalograph, and also with the treatment of disease, by the use of radiant heat, infra-red and ultra-violet rays, the electronic stimulator, high-frequency apparatus, and radio-therapy.

Lighting Fittings

A TWO-PART subject was considered at this month's meeting in London of the Illuminating Engineering Society. Mr. J. G. HOLMES spoke about the manufacture of glass and methods of imparting to it those properties which are desirable for its use as lighting ware.

Mr. P. HARTILL followed with a brief outline of some of the many considerations involved in the design and construction of metal components of lighting fittings. He concluded with a discussion of metal reflectors, comparing different forms of surface treatment, degrees of light control and magnification of intensity obtainable.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN agreement with the Foreign Office, the Department of Scientific and Industrial Research has appointed **Mr. A. H. Waterfield,** a principal scientific officer, formerly of the Ministry of Supply, for scientific liaison duties in France, with the rank of attaché at H.M. Embassy in Paris.

Dr. C. Dannatt, chief electrical engineer and director, Metropolitan-Vickers Electrical Co., Ltd., has been appointed a member of the Mechanical Engineering Research Board of the Department of Scientific and Industrial Research, in succession to the late Mr. D. B. Hoseason.

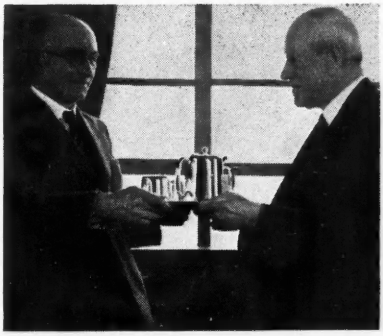
Mr. P. R. Blake, A.M.I.E.E., is retiring from the office of managing director of the South Wales Transport Co., Ltd., and of the Swansea Improvements and Tramways Co., on 30th June, after forty-six years' service in public utility undertakings. Mr. Blake will retain his seat on the boards of both companies for a time.

The annual general meeting of the Fire Protection Association was held in London on 6th April, when the chairman, **Sir Arthur Morgan,** F.C.I.I., announced his resignation for health reasons. At a Council meeting later, **Mr. J. W. J. Levien,** previously deputy chairman, was appointed to succeed Sir Arthur as chairman, and **Mr. T. Wallas** was appointed deputy chairman of the Association.

Mr. A. J. Cheyne, who for thirty-five years has been a branch manager of the General Electric Co., Ltd., fifteen years at Hull and twenty years at Sheffield, has retired after forty-four years with the company. Mr. Cheyne joined the G.E.C. in 1903 as colliery representative at the Newcastle branch and later transferred to the Birmingham branch. He left the company at the end of 1912 and rejoined it in 1914 as manager of the newly formed Hull branch. In 1929 he was appointed manager of the Sheffield branch. To mark his retirement a lunch was held in his honour on 30th March, and he was presented with a silver tea set and tray by Mr. A. G. Hawkins, manager of the North-Western area, on behalf of the Sheffield staff and other G.E.C. colleagues.

Mr. W. K. Degenhardt has been appointed manager of the Sheffield branch as from 1st April. Mr. Degenhardt began his career in the G.E.C. in 1930 with an apprenticeship at the Witton Engineering Works. He moved to head office in 1933, spending three years in the Engineering Department and then transferring to the Sales Department, where he remained until the outbreak of war. On demobilization from the Royal Artillery in 1946 with the rank of major, he spent six months at the Newcastle branch and then rejoined the Sales Department.

At a luncheon at Telcon Works, on 1st April, **Mr. M. C. Timms,** M.I.E.E., formerly manager of the submarine cable factory, was presented with a silver tea service and binoculars by Sir Geoffrey Clarke, managing director, on behalf of his colleagues in



Sir Geoffrey Clarke (right) making the presentation to Mr. M. C. Timms.

the Telegraph Construction and Maintenance Co., Ltd., and Submarine Cables, Ltd. The presentation marked Mr. Timms' retirement, and Sir Geoffrey spoke of the esteem in which he was held by all his associates.

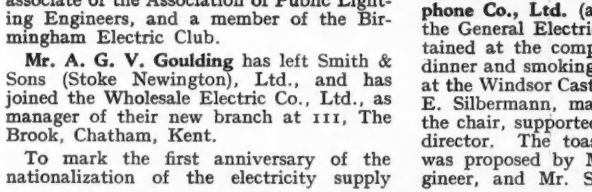
Mr. M. H. Turner, district engineer under the North-Eastern Electricity Board is to retire at the age of sixty-one. He has been in the electricity supply industry for forty-six years and has thirty years' service with the North-Eastern Electric Supply Co. He has been district engineer for about twenty-six years.

Mr. H. Long, M.I.E.E., F.I.E.S., has been elected an honorary member of the Illuminating Engineering Society. He has devoted his life to illumination and, when he went to the Midlands in 1937, formed the Birmingham Centre of the Society, of which he became first chairman in 1938-39. Mr. Long has served several periods on the National Council and Local Centre Committee and is a past national senior vice-president of the Society. Mr. Long is also a

member of the Membership Committee of the Illuminating Engineering Society of America. He has done committee work for the British Standards Institution, the National Illumination Committee, and the Electrical Research Association, and is an original associate of the Association of Public Lighting Engineers, and a member of the Birmingham Electric Club.

Mr. A. G. V. Goulding has left Smith & Sons (Stoke Newington), Ltd., and has joined the Wholesale Electric Co., Ltd., as manager of their new branch at 111, The Brook, Chatham, Kent.

To mark the first anniversary of the nationalization of the electricity supply



Members of the staffs of the B.E.A. and Electricity Boards at the B.E.A. Easter School.

industry the staff of the **South Wales Electricity Board** held a "birthday" party at the City Hall, Cardiff, on 31st March. There were more than 700 present at the celebrations, over which Mr. L. Howles, the Board chairman, presided, accompanied by Mrs. Howles. Mr. E. Jones (deputy chairman) and Mrs. Jones, Mr. B. Curran (a member of the Board), the chief executive officers and Sub-Area officers, with their ladies, were also present, and among the guests were Mr. H. V. Pugh (divisional controller) and Mrs. Pugh. There were parties from the outlying districts of each of the four Sub-Areas. The high spot of the function was a cabaret interlude during which the "S.W.E.B. Adorables," a party of young lady members of the Board's staff, performed a dance number entitled "The Anniversary Waltz," and presented a cake decorated with one candle to Mrs. Howles. After the ceremony of cutting the cake the chairman unveiled a screen bearing a painted reproduction of the crest which the South Wales Electricity Board will shortly be publicly introducing as its emblem.

Nearly 150 engineers from the London office and head office of the **Reliance Telephone Co., Ltd.** (a subsidiary company of the General Electric Co., Ltd.) were entertained at the company's annual engineers' dinner and smoking concert on 26th March, at the Windsor Castle, Victoria, S.W.1. Mr. E. Silbermann, managing director, was in the chair, supported by Mr. W. T. Ashton, director. The toast of "The Company" was proposed by Mr. F. Keene, chief engineer, and Mr. Silbermann in his reply thanked the employees for their loyal support. He regarded as indicative of the good relationship which existed the fact that such a large proportion of the staff had completed twenty-one years' service.

Wills

Mr. H. W. Couzens, M.I.E.E., consulting electrical engineer, a director of the Oxford Electricity Co., and a former borough electrical engineer of **Taunton,** who died on 24th August last, left £7,740 gross (£7,421 net).

Mr. W. Taylor, vice-chairman of Clyde Crane & Booth, Ltd., Gateshead, and senior director of Clarke, Chapman & Co., Ltd., who died on 28th December last, left £37,513 gross (£35,589 net).

I.E.E. Section Dinner

THE dinner, a purely informal function, arranged last week at the Café Royal by the Utilization Section of the Institution of Electrical Engineers was well supported. Mr. R. O. Ackerley (Section chairman) presided and expressed his pleasure at the presence of the president and two other Section chairmen, on whose behalf Mr. T. G. N. Haldane briefly responded. The company of 125 was afterwards entertained by Messrs. J. Vaughan Harries and W. R. Stevens with songs and Mr. J. F. Stanley, a member of the Magic Circle, demonstrated a number of new conjuring tricks.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Heathcoat Amory called attention to the charges for electricity connections in rural areas. He said that all parties were committed to a substantial programme of agricultural development, and a prerequisite to carrying out that programme was improvement in housing, water, electricity and transport. The present rate of progress was too slow. What had happened was difficult to reconcile with the promises made by the Government in 1945. Nationalization was to mean cheap and plentiful electricity, but to-day the terms were certainly no better than those offered by the old authorities.

At present the Area Boards seemed to be somewhat handicapped by existing regulations. He suggested that the Minister, as recommended by the National Farmers' Union, should see that the B.E.A. undertook a national programme to complete the job of connecting up the 150,000 farms which were without electricity within the next ten years. He understood that the B.E.A. set up a year ago a sub-committee to report on what would be the best method of dealing with the extension of electricity to farms. When was that committee likely to produce results? The Minister should instruct the Authority to work out a scale of charges for those extensions which would be within the means of those consumers who wished to take the supply.

Mr. Palmer suggested that there were two economic ways of making electricity available to the countryside. They could group the urban and rural districts and, by so doing, use the urban consumer tc subsidize the rural consumer. He saw no particular objection to that, but if such a method was to be carried through quickly it would mean placing a very heavy burden on the urban consumer at a time of economic difficulty. If it was regarded in the national interest to have an efficient and up-to-date agricultural industry, the Government might consider making a direct subsidy or assisted loans for the sole purpose of rural electrification.

Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power said that the number of farms that were connected up on 31st March, 1948, that was by vesting day, was 81,853. During the nine months up to 31st December, 1948, that number had risen to 88,147, an increase of 6,294. The speed at which the job could be done was, of course, limited by the amount of material and labour available, and the distances of the linkage.

The B.E.A. had advised them that the capital budgeted for the Area Boards for rural schemes to be initiated during the year commencing 1st April, 1949, was upwards of £5,000,000. Of that £3,000,000 was required for extensions to the existing networks and £2,000,000 was for development in entirely new ground. The question of tariffs for rural areas raised an issue of very high policy, and the B.E.A. had remitted the matter to a special committee. They must await its findings, and then they would have some uniform national policy.

Scotland and Television

Mr. Paling (Postmaster-General) told Sir William Darling that he was sorry that he was unable to say when television services would be extended to Scotland. He also said that 120,100 television licences were current at the end of February, 1949.

The 1949-50 Budget

IN the course of his introductory speech on the 1949-50 Budget, the Chancellor of the Exchequer (Sir Stafford Cripps) referred to the continued shortage of power plant and the need for sustained economy in the use of electricity. This formed part of a general survey of the country's economic position after what the Chancellor described as "a year of great achievement."

Sir Stafford Cripps said that investment plans for the ensuing year emphasized the need for further industrial expansion and modernization and for the necessary capital expenditure upon agricultural development. He stressed the fact that the maintenance of social services precluded any reduction in expenditure and therefore in taxation, and it was still necessary to check inflation.

Turning to his proposals for the financial year Sir Stafford announced a reduction in the beer duty and the stabilization of the food subsidies, involving an increase in prices of certain commodities. He proposed to repeal the stamp duties on a number of documents and also the duty on bonus issues of securities imposed in 1947. There would also be certain alterations in death duties and in the taxation of insurance contributions and benefits.

The present surcharge on telephone sub-

scribers' local calls would be raised from 15 to 50 per cent, and that on certain other services from 15 to 33⅓ per cent. No changes in the purchase tax could be afforded this year.

At present the initial wear and tear allowance on new plant and machinery for income tax purposes was 20 per cent. As a full allowance of 100 per cent was made over the life of the plant there was no difference in the long run, but the immediate result of the large initial allowance was that more money was available for additional equipment at an earlier date. To meet the further rise in prices which had occurred, he had decided to double the initial allowance, making it 40 per cent.

The Chancellor said that he had been approached by the Federation of British Industries regarding methods of calculating profits. He proposed as a first step to appoint a committee to examine the technical issues which arose in connection with the computation of taxable profits.

Industry and the House

Points in the Budget Speech

By F. J. ERROLL,
M.A., A.M.I.E.E., M.P.

SIR STAFFORD CRIPPS' Budget is designed to show the country how to pay for the Welfare State which has been created. In his Budget address on 6th April the Chancellor of the Exchequer made a deep impression upon the House and caused not a little dismay to his own supporters. It is true that all parties have come out in favour of extended social services, but many M.P.s seemed to have forgotten that the bills were beginning to come in and would have to be paid. The Chancellor showed how this was to be done in a speech of great eloquence and lucidity lasting for two and a quarter hours.

After referring to the great achievements of 1948 and the progress Britain had made towards full recovery Sir Stafford could not resist an unfavourable mention of the electricity supply industry before nationalization. He said that the Government's forecast for generating plant had been much too optimistic, "partly as a result of the previous lack of co-ordination in programming supplies." That defect, he affirmed, had now been overcome and great efforts were being made to push forward with the construction of new power stations. For the time being, however, there would have to be the maximum economy of power at times of peak load.

Direct and indirect taxation would have to remain at more than 40 per cent of the national income if the present level of the social services was to be maintained. In this sentence Sir Stafford disposed of most of the hopes for taxation relief. The social services are a permanent and continuing obligation, and, as Sir Stafford Cripps reminded the House, one which automatically increases as those services inevitably develop. Owing to the publicity being given to the new health service at the moment, individuals may be forgiven for thinking that this is the major social service and the most costly. But education is costing £208 million, national insurance and national assistance almost £300 million, while the health service will account for £260 million. Education is going to become more costly as reforms come into operation and, because of the increased birth rate, an increase of 33,000 teachers will be required for this reason alone.

In regard to food subsidies, Sir Stafford Cripps has taken a bold step. He has decided definitely that there must be a limit to the amount of money spent on keeping food artificially cheap. This move will be most unpopular at a time when rising domestic expenses make it difficult to keep within one's personal means.

Against such a display of fixed or increasing outgoings it seems useless to press for tax reductions. The Chancellor made this plain. The benefits have got to be paid for by taxation, direct and indirect. The only way to avoid this, he said, would be to cut down the social services themselves, "and that I do not believe anyone is prepared to recommend, because we all know their immense value to the people of this country." However, it is doubtful whether the people of this country would have so eagerly endorsed the programmes of extended social ser-

vices if they had known how big the bill was going to be in new and permanent taxation when all the separate items were added up.

So it comes about that the Chancellor cannot afford to make any change at all in the rate of purchase tax. This tax now produces almost £300 million a year and is much too valuable a source of revenue to be discarded. Whether the public really wish to pay for their "free" spectacles when they buy electric fires and other taxed articles is open to question, but that the tax is to remain, at any rate for the time being, seems certain. Sir Stafford admitted that there is a problem about retail stocks when the time comes for a reduction in the level of purchase tax. He promised to work out some means of meeting the problem during the coming year, and thus diminishing any hold-up of trade in articles subject to purchase tax. From this one may deduce that he has reductions in mind for next year, or the year after, but that seems a long way off at present.

Increased Income Tax Allowances

In view of the sternness of the Budget M.P.s were delightedly surprised that the Chancellor should have been able to make some concession to industrial companies who are faced with the difficulties of financing the cost of replacement of old machinery. The Income Tax Act, 1945, gave some assistance by allowing an initial allowance for wear and tear of 20 per cent of the new cost. Sir Stafford has decided to raise this to an allowance of 40 per cent in the year in which the expenditure is incurred, commencing on 6th April, 1949. The cost of this to the Treasury in the coming year will be negligible. In 1950 it will amount to £40 million and in the following year to about £75 million. In later years the cost will be less when smaller percentage allowances will fall to be made owing to the larger percentage already granted. Over a period of years there will, of course, be no loss to the Exchequer as the loss of revenue will be only temporary. This allowance is really a short-term tax-free loan from the Exchequer to the businesses relieved. At a time when many firms are short of the necessary capital to execute modernization programmes this relief will be of great value.

The Chancellor has made no attempt to deal with the problem of replacing stocks at higher prices. Tax has to be paid on all increases in value of old stocks and this money is not, therefore, available for the purchase of new stocks at higher prices. At least the Chancellor has agreed upon the necessity of helping industrial re-equipment and has done so by a method which gives quick and speedy relief. He has also decided to set up a committee which will examine the method of computing net trade profits for the purpose of charging them to income tax and profits tax, and also the question of the basic period to be taken in assessing the tax on the profits to be ascertained. Welcome though this step is, it is belated, and so the question may well have become one of desperate urgency before the committee's findings have been arrived at.

Industry will welcome, too, the end of the tax on bonus issues. This tax always savoured of marked political prejudice, and even Socialist M.P.s were at a loss to explain it. Such issues can be completely controlled in the same way as any other form of capital issue, and the abolition of this additional impost is a satisfactory move.

The increase in telephone charges came as a shock to the entire House. Members on all sides sighed and even groaned as the Chancellor announced the increases. This is an unpopular change for several reasons. It is undesirable to use the Post Office services as a means of raising revenue. The telephone is an essential part of the life of a civilized community. It should therefore be as cheap as possible and not made artificially expensive. The increased charges will bear heavily upon active, quick-moving businesses and firms and represent an additional cost which they will have to meet. Finally, the increases are a clumsy attempt to damp down the growing demand of the public for telephones in their homes.

Iron and Steel Subsidies

The removal of the principal iron and steel subsidies, announced the previous week, is quite in line with Budget policy. All the subsidies are to be abolished, except those paid to keep down the prices of imported finished steel and "semis." The subsidies have often been mistakenly described as subsidies to the iron and steel

industry, but in fact they are subsidies to steel users, since it is the users who benefit from the low Government-controlled price made possible by the subsidies. Mr. Oliver Lyttelton said that the Opposition was generally in agreement with any move towards realistic prices, and asked for an assurance that the price of steel in this country would still compare favourably with world prices, an assurance which Mr. Strauss readily gave. Many M.P.s feel that the price increases have been made too late. The iron and steel industry is rapidly overtaking arrears of demand, a demand which is likely to be reduced by these latest price increases. At a time when export prices must be lowered if Britain's competitive position is to be maintained, any increase in the price of steel is to be regretted. Two years ago an increase could have had a useful effect.

The intense public dissatisfaction over the winter surcharge on electricity was voiced eloquently by Mr. Rankin, Labour M.P. for the Tradeston Division of Glasgow, on the eve of the Budget. He showed that the Minister had extracted a total sum of £264,000 from Glasgow when the estimated deficiency for the current year was only £131,945. He accepted the need for the basic increase necessary to overcome the deficit, but the second increase—the winter surcharge—he said, "had created much and well-merited protest." Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power, stated once more the reasons for the winter surcharge recommended by the Clow Committee. He described it as "the recommendation of a price disincentive"—surely a delightful euphuism for making electricity too dear to use.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

Wholesalers and Middlemen

AS manufacturers, we must agree with the remarks in your leaderette of the 1st April on this subject. We feel very strongly that sufficient publicity is not given to the function and service that the wholesaler can, and does, perform.

It is very definite that in our own business — manufacturers of conduit fittings only—if we were to sell direct, the cost would increase out of all proportion to the value of the goods, and the contractor would not have the service he does get, when the wholesaler performs his proper function. We think this applies to all specialist manufacturers, as ourselves.

F. C. BLACKWELL & CO., LTD.
H. FRENCH
(*Director*),

Liverpool, 23.

Abandonment of London Tramways

ON reading the letter on this subject in your issue of 18th March one wonders what will happen in bad weather. Trams keep going in fog, also on icy roads, and in rain there is no fear of skidding and the accident rate is thus reduced. The increase in buses needed will greatly increase congestion. The life of a bus is twelve years, whereas a tram lasts twenty years. Some of London's trams are nearly forty years old, a fine tribute to their builders.

In the United States where oil is plentiful the "P.C.C." tram is in great favour. Why not a "P.C.C." system in London to keep down fares? Londoners pay about the highest fares in this country.

So why not modernize the trams and spend only about £5,000,000 instead of £10,000,000 every twelve years?

*London, S.W.*17. A. EVEREST.

[The American "P.C.C." takes its name from the Presidents' Conference Committee responsible for choosing the details of its design.—EDS.]

Engineers' Guild

A RECENT successful general meeting of the Metropolitan Branch (chairman: Mr. C. W. Niel McGowan) of the Engineers' Guild was addressed by Mr. C. A. Fell (solicitor) on the constitution and working of the Law Society. Many points of similarity were brought out between the aims and objects of the Society and the Guild in catering for the needs of their respective professions.

Tariff Negotiations

Need for Close Watch on Geneva Conference

JOHN C. HANCOCK

IN the exhilarating springtime atmosphere of the Haute Savoie on Monday of this week, the original contracting parties to the General Agreement on Tariffs and Trade commenced their third session. During their deliberations they hope to tie up some of the loose ends which were left unfinished at their second session in Geneva eighteen months ago, and at the same time they will afford the newcomers, about a dozen additional countries, opportunities of negotiating new tariff concessions among themselves and with the original signatories.

From the information that has started to leak out, at least three of the newcomers, namely Denmark, Italy and Sweden, are reported to be asking Australia, India and New Zealand to reduce their import duties on electrical items ranging from fans to smoothing irons.

These facts alone, whether they represent the total concessions likely to be sought or not, should suffice to put all electrical traders and manufacturers on the look-out for bigger and more extensive tariff adjustments contrary to their interests, and should serve as a warning that these negotiations should be followed with extreme vigilance.

Scope of Negotiations

According to an announcement made by the Board of Trade on 6th November last the questions to be discussed during the current negotiations fall into three main classes:—

(1) Reduction or stabilization of import duties imposed by any of the countries taking part on imports from the United Kingdom.
(2) Reduction of margins of preference at present accorded by other Commonwealth countries to United Kingdom goods.
(3) Modification of the United Kingdom tariff.

At the same time the Board of Trade stated that while it was anxious to receive the advice of industry on these matters, it already had available the views expressed in 1947 as to the degrees of importance attached to the margins of preference accorded by Commonwealth countries, and the need to maintain the existing levels of protection in the United Kingdom tariff.

Without in any way casting reflections on the abilities of our negotiators, traders and manufacturers will be the first to appreciate that our representatives at these international negotiations cannot do their job unless they are properly "briefed." Electrical traders and manufacturers, therefore, would do well to ask themselves whether they have made their wishes known in a forceful enough manner, either individually or through their respective trade associations. Whether any purpose would be served in making representations on matters tabled for discussion during the present proceedings is doubtful, but traders and manufacturers could meanwhile hold watching briefs on their own behalf and decide if they could usefully intervene before future conferences are arranged.

Geneva and Havana

No doubt many in the electrical industry are under the impression that the Geneva tariff negotiations are conducted under the auspices of the International Trade Organization (I.T.O.) which was brought into being as a result of the United Nations Conference on Trade and Employment at Havana, from November 1947, to March, 1948. This is not the case: the present conference at Annecy, near Geneva, and the tariff changes which have been made at previous meetings, have been effected under the Geneva Agreements and *not* the Havana Charter. The President of the Board of Trade stated this in reply to a question in the House on 5th February.

The so-called Havana Charter contains provisions concerning, among other things, restrictive business practices, state trading and import restrictions, as well as provisions relating to tariffs and pre-

ferences, etc. So far, although it has been signed by 53 nations, the Charter has not yet been ratified. The General Agreement on Tariffs and Trade has already been put into operation by most of the original contracting parties, of which the United Kingdom is one.

While the Government has given an undertaking that the Havana Charter will be presented to Parliament before ratification no such promise has been made as far as the Geneva Agreements are concerned. Is it not possible, therefore, that we may find ourselves tied to some of the provisions of the Havana Charter—but under another name—without any debate in Parliament being allowed, and against which no effective protest can be made?

While we must hope that no bad bargains will be struck at this, the third round of the Geneva Tariff Agreements, electrical traders and manufacturers would be well advised to follow the proceedings closely.

Canadian Opportunities

MEMBERS of the recent Engineering Mission to Canada were present at an Institute of Export luncheon held at the Connaught Rooms, London, W.C.2, on 7th April. Mr. Leslie Gamage, M.C., president of the Institute, in welcoming the Mission, said that trade between this country and Canada meant much more than closing the "dollar gap"; it was a means of strengthening the bonds between them. There was a tremendous amount of goodwill towards the Mother Country in the Dominion.

Sir Harry Gilpin, the leader of the Mission, in a brief address also stressed the existence of goodwill and said that Canada wished to buy more from us, and regretted our "bilateral" trade arrangements which stood in the way. Although the Dominion had a strong engineering industry it still had to import engineering products to the extent of about $100 million a year and most of these came from the United States.

The Mission had advocated some form of industry representation in Canada to assist the smaller firms which were unable to make their own arrangements. He was glad to say that the President of the Board of Trade had approved the idea, and a committee was now studying the possibilities. It should be emphasized that any Government-supported scheme would have to be open to non-members as well as members of trade associations.

Every encouragement should be given to schemes of post-graduate training in this country for young Canadians. Another important matter was that catalogues should give the fullest possible information about the construction and operation of plant.

The Board of Trade and Ministry of Supply were arranging a great display of British machine tools in Toronto next spring. Sir Harry warned manufacturers that to secure firm business they would have to set up a satisfactory spares and service organization. Likewise the establishment of factories by British manufacturers must be preceded by the establishment of a market. It was important that the higher executives of manufacturing concerns should visit Canada and cover the whole of the country—especially the Western Provinces.

Mr. A. E. Bryan, Commercial Counsellor in the Canadian High Commissioner's office, London, pointed out that last year Canada superseded the United States as Great Britain's largest supplier. It was important that Great Britain should increase her trade with the Dominion, but British manufacturers seemed to have an inferiority complex in relation to the Canadian market. Full advantage had not been taken of tariff preferences and there was an inordinate fear of United States competition.

Although Canada's electrical industry produced goods to the value of £100 million annually there were still electrical imports of over £17 million; the United States accounted for 95 per cent of this. He felt that British manufacturers should be able to increase their proportion of the trade beyond the present 5 per cent.

British Association

PRELIMINARY details of the annual meeting at Newcastle-upon-Tyne of the British Association for the Advancement of Science (31st August to 7th September) are now available, with registration form, from the secretary at Burlington House, Piccadilly, London, W.1.

Sir John Russell, O.B.E., F.R.S., is the president, and the vice-presidents include Sir Claude Gibb, C.B.E., F.R.S., who is also a vice-president of Section G—Engineering. The president of that Section is Sir Arthur Fleming C.B.E., whose address (on 5th September) will bear the title "Bridging the Gap Between Science and Industry." In the Engineering Section two evening lectures are being arranged—on coal face lighting and electronics. The programme of tours, etc., includes visits to Carville and Dunston power stations and a number of industrial establishments.

A conversazione is being arranged by the North-East Coast Institution of Engineers and Shipbuilders for members of the Engineering Section.

COMMERCE and INDUSTRY

Oslo Mechanical Handling Display : Trolley-buses for Portugal

THE Norwegian Development Association —in co-operation with the British Export Trade Research Organization—staged a small but successful mechanical handling exhibition in Oslo during the last few days of March. Twenty-three firms manufacturing mechanical handling equipment of all kinds sent over a display of models, photographs, technical diagrams, films and descriptive literature, and invitations were sent to more than 1,500 Norwegian industrialists and the heads of Government departments, the Army, Navy and Air Force. Although the display was primarily technical rather than a sales exhibition, sizeable orders—complete plete with import licences — were reported. Outdoor demonstrations were held each day of trucks and cranes.

Radio-Equipped Drainage Service

The Middlesex County Council has been recommended to approve the introduction of radio communication into its West Middlesex main drainage service in order to provide constant communication between the individual sewer gangs and the Central Depot, Mogden, Isleworth. Mogden would thus become the first radio-equipped main drainage service in Great Britain. The recommendation provides for one fixed station at Mogden and four mobile stations.

The 70 miles of sewers in the West Middlesex area, covering fifteen local authorities, are maintained by mobile sewer gangs operating from the Central Depot at Mogden, a system which has enabled the number of fully trained men employed to be greatly reduced. Speedy intercommunication is important with this small mobile force, which may be dispersed at different points in the 160 square miles of the drainage district. The new method of communication would enable a gang to be quickly directed to any point for urgent work. Emergency work may include rescue operations involving the use of oxygen breathing apparatus, which is available on each sewer van.

Productivity Studies

Under the Anglo-American scheme for the investigation of means of improving production a party of British industrialists and trade unionists is at present visiting engineering works in the United States. The accompanying picture shows some of the party at the Leeds & Northrup Company's works, Philadelphia, in which electric furnaces, control gear and instruments are produced.

British delegates at an American Works. Left to right: Mr. G. M. Bostock (American General Electric Co.); Sir Peter Bennett (Joseph Lucas Ltd); Mr. James H. Robins (President, Metal Manufacturers' Association, Philadelphia); Mr. Jack Tanner (President, A.E.U.), Mr. E. C. Knoll (American General Electric Co.) (behind Mr. Tanner); Mr. C. S. Redding (President, Leeds & Northrup Co.); Mr. Lee W. Minton (Glass Bottle Blowers' Association); Mr. J. C. Hess (Leeds & Northrup Co.); Mr. G. W. Tall, Jr. (Leeds & Northrup Co.)

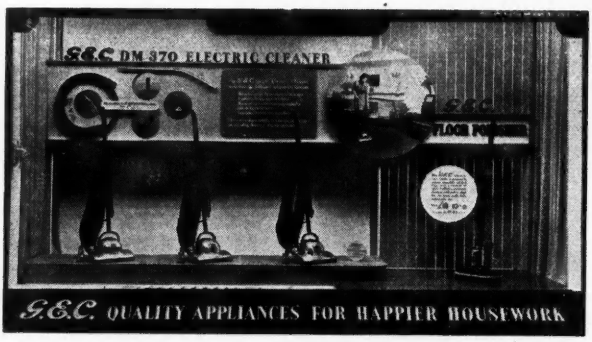
The Nature of Plastics

A scientific film made by Bakelite, Ltd., which was shown in London for the first time last week, tells the story of plastics in terms that will hold the interest and understanding of the intelligent layman. It is not confined to the products of Bakelite, Ltd., but considers plastics as a group of materials, explaining what they all have in common, how they are built up and why they differ from natural materials. It is

pointed out that plastics offer a combination of properties not possessed by any other group of materials, but that their contribution to industry and to life generally is made in association with the older materials such as wood, brick, stone and metals, rather than in competition with them.

Magnet House Window Display

A display of domestic electrical appliances under fluorescent lighting has been arranged by the general Electric Co., Ltd., at the company's head office, Magnet House, Kingsway, London, W.C.2. The two display windows both have two four-lamp fittings containing 5ft 80W "Osram" fluorescent lamps. The lighting was switched on on 2nd April when the restrictions on shop window lighting were relaxed.



Fluorescent window lighting at Magnet House

Howden's Magazine

We have received from James Howden & Co. (Land), Ltd., a copy of "Howden's Quarterly" (No. 6). This well-produced house journal contains, in addition to domestic news, interesting articles on installations of Howden forced and induced draught fans on the R.M.S. *Caronia*, and the company's auxiliary equipment installed at Kingston-on-Thames power station.

Scottish Electrical Exhibition

A comprehensive display of electrical appliances combined with ceilidhs (singsongs), with the Campbeltown Gaelic choir, organ recitals, film shows and competitions is the North of Scotland Hydro-Electric Board's method of bringing the latest developments of the electrical industry to the attention of consumers. On 20th April the Board's exhibition opens in the Victoria Halls, Campbeltown, Kintyre. For farmers the electrical display will include electric hand-dryers, churns, dairy bucket heaters, steam raisers, sterilizing chests, soil warming equipment, cattle and sheep shearers, brooders and water pumps. A section for hotel and boarding-house keepers will contain ice cream freezers and sterilizing equipment, tea urns, heavy duty cookers, toasters, waffle machines, bread slicers, refrigerators and potato peelers. The electrical requirements of garages, workshops and boatyards will be catered for by a wide variety of portable hand tools and such items as chain saws, while a medical display will include infra-red and sun-ray lamps. A wide range of domestic appliances also will be shown in their appropriate settings.

Television in Scotland

The B.B.C.'s latest television equipment was on view to the public last week in the Royal Scottish Museum, Edinburgh. There is no immediate possibility of a television service for Scotland, but many people took advantage of the opportunity of seeing the equipment in action. It was brought to Edinburgh in connection with the Faraday Lecture on television by Sir Noel Ashbridge.

Garcke's Manual

Circumstances have necessitated changes in "Garcke's Manual of Electricity Supply" for 1948-49 (Electrical Press, Ltd., 23, Great Queen Street, W.C. 2. Price £3 3s net). The arrangement of the matter under the names of the former owners of electricity undertakings is retained in this "transitional" volume; in each case the Board in which the undertaking is now vested is given and latest available accounts and other statistics of each former undertaking are reviewed.

There is a "message" from Lord Citrine, chairman of the British Electricity Authority, and extracts from a paper by Sir Henry Self dealing with the national and area organization of electricity supply. Statistical tables—engineering and financial—are given and there are particulars of the Divisions, Area Boards and Consultative Councils. At the end are a directory of officials and a list of electrical associations, institutions, etc.

Trolley-bus Orders

The first order to be placed with a British manufacturer for trolley-buses for Portugal has been secured by Sunbeam Trolley-bus Co., Ltd. These vehicles are for the city of Coimbra. The chassis will be the Sunbeam MF2B type, which is designed specially for single-deck bodies of the Continental type. The bodies will be constructed by Park Royal Vehicles, Ltd. A further repeat order for Sunbeam trolley-bus chassis has also just been received from Mexborough and Swinton, and Reading Corporation has recently placed another order with the Sunbeam Co. for a fleet of Sunbeam chassis of the three-axle type. These will have 70-seater double-deck bodies with a number of new features. All these chassis will be fitted with B.T.H. electric traction equipment.

Catering Trades Exhibition

Next year's Hotel, Restaurant and Catering Exhibition will be held at Olympia from 25th January to 3rd February.

London Wholesalers' Showrooms

The West End branch of the Wholesale Fittings Co., Ltd., at 101, Dean Street, Oxford Street, W.1, which was damaged during the war, has now been reinstated, and in addition to the trade counter, an effective display of modern and period fittings, domestic appliances, lighting glassware and radio can be seen in the enlarged showrooms. In view of the relaxed lighting restrictions the company is making a special feature of mirrored glass reflectors for shop windows, as well as outdoor lanterns, signs and decorative lighting equipment. A new priced catalogue of domestic electrical appliances (Supplement No. 401) has recently been issued by the company.

The reinstated London showrooms of the Wholesale Fittings Co., Ltd.

Metrovick Window Unit

The Metropolitan-Vickers Electrical Co., Ltd., has now available a new small window display unit in attractive colours advertising "Metrovick" and "Cosmos" lamps. The overall dimensions of the display are 27in by 24in.

Lamp display unit produced by the Metropolitan-Vickers Electrical Co.

Bell Transformers for Mines

Intrinsically safe transformers primarily intended for bell signalling circuits in coal mines are the subject of BS. 1538, thus remedying the incompleteness of Section C of Part 2 of BS. 355, which is ten years old. The new specification prescribes a single-phase double-wound transformer for 240 or 110 V input and open circuit 15 V output, together with appropriate tests. The document is obtainable for 2s from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Mine Locomotives

The newly made Coal Mines (Locomotives) General Regulations, 1949, are to come into operation on 1st May next. They refer mainly to oil engines for haulage underground. Regulation 6 of Part III states that the part of every locomotive in which a battery is carried shall be constructed to resist rough usage and be properly ventilated. Part VII contains additional provisions for the charging of batteries and the construction and ventilation of charging stations.

This Statutory Instrument, 1949 No. 530, ie obtainable from H.M. Stationery Office, price 3d.

Factory Installation

The accompanying photograph shows a recent installation of the Enfield Cables grid suspension wiring system at the works of the Coseley Engineering Co., Wolverhampton, demonstrating the ease with which steel-frame buildings can be wired without the use of steel conduit. The installation was carried out by C. A. & W. J. Postings, of Wolverhampton.

Catenary wiring at a Wolverhampton factory

Advertisement Correction

We are informed that the price of the "Universal Taylormeter" shown in the advertisement on page 4 of our 8th April issue was incorrectly given; it is 10 guineas.

Trade Announcements

Merchant Adventurers of London, Ltd., are now at 43, Portland Road, London, W.11.

Premier Electric Heaters, Ltd., have acquired the business of Hystan, Ltd., Redhill, manufacturers of imitation coal fires.

Thomas De La Rue & Co., Ltd., announce that as a result of their recent re-centralization policy, the business of their two wholly owned plastics subsidiaries, De La Rue Insulation, Ltd., and Hill, Norman & Beard Plastics, Ltd., has been transferred to the parent company and both businesses will, as from the 1st April, operate as the Plastics Division of Thomas De La Rue & Co., Ltd. Apart from this change of status the continuity of the business will be unaffected, and no changes of personnel will be involved.

Change of Address

From 9th April the Ministry of Works Regional Offices, Newton Street, Virginia House, Gt. Ancoats Street, and Hudson Buildings, Gt. Ancoats Street, will be accommodated at Government Buildings, Warwick Road South, Manchester, 16.

Catalogues and Lists

W. T. Henley's Telegraph Works Co., Ltd., 51-53, Hatton Garden, London, E.C.1. — Technical brochure on voltage operated earth-leakage circuit breakers for domestic use.

H. J. Enthoven & Sons, Ltd., Forum House, 15/18, Lime Street, London, E.C.3. — Technical brochure on "Superspeed Special" rosin-cored solder. (Also in French, German and Spanish.)

John Davis & Son (Derby), Ltd., All Saints Works, Derby.—Leaflet (No. 493B) on the "Drake" 1-6 shot L.T. exploder.

The Arora Co., Rosebery Street, Loughborough.—Priced leaflet on a domestic warming plate.

Simmonds Aerocessories, Ltd., Treforest, Glamorgan.—Catalogue of "Spire" speed nuts.

Astral Equipment, Ltd., 146, Buchanan Street, Glasgow, C.2.—Illustrated folder describing a 1.5 cu ft domestic refrigerator.

Duncan Low, Ltd., 299, Bell Street, Glasgow, C.4.—Catalogue (No. 107) of industrial immersion heaters.

Hellerman Electric, Ltd., Tinsley Lane, Crawley, Sussex.—Catalogue describing a binding and marking system for flexible cables.

British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2.—Folder illustrating "Mazdalux" cold cathode lighting fittings.

United Strip and Bar Mills, Sheffield.—Illustrated brochure describing the manufacture of hot-rolled strip steel.

Electricity Supply

B.E.A. and "Smokeless Zones" : S.W. Scotland Board's Activities

ONE clause of the Bolton Corporation Bill recently considered by a House of Commons Select Committee sought to empower the Corporation to establish "smokeless zones." The British Electricity Authority presented a petition against the clause on the grounds that it would cause hardship to the public and would prevent the Authority from carrying out its statutory obligations. The Committee agreed and decided against the clause.

Eastern Consultative Council

At the last meeting of the Eastern Electricity Consultative Council the chairman (Ald. W. J. Bennett) reported that he had attended a meeting of Consultative Council chairmen at which the report of the Clow Committee was considered. It had been decided to recommend to the Minister of Fuel and Power the immediate abolition of the surcharge, but if that were impracticable, that the surcharge should not be continued in its present form during next winter. The Council endorsed this. Members emphasized that, in their view, the only solution of the peak-load problem was to employ a maximum amount of publicity to make the public aware of the need for switching off domestic apparatus during peak periods.

The financial policy of the Eastern Electricity Board in handling rural extensions was approved, and it was decided that the application of the Gipping Rural District Council for the provision of electricity to a hamlet in its area could not be supported as the cost would be prohibitive.

Distribution in Glasgow

Plans for bringing Glasgow's electricity supply system up to date were outlined at a Press conference last week by Mr. J. S. Pickles, chairman of the S.W. Scotland Electricity Board. Distribution at present, he said, was by 22 kV underground cables laid nearly 30 years ago, and many of these were approaching the end of their useful life. The Board had decided to lay 132 kV cables from the station at present being built at Braehead, on the south side of the Clyde, to substations to be set up at Govan and Haggs Road. A new 33 kV distribution system would be established from these centres. The existing 22 kV feeders would then be used at 6.6 kV. The total expenditure of about £2,000,000 would be shared between the Area Board and the Central Authority. It was hoped that part of the scheme would be ready by the winter of 1951-52, and that it would be completed in 1952-53. Later, the 132 kV cables would be extended to the station at St. Andrew's Cross, near Eglinton Toll.

Reviewing the first year of the Board's work, Mr. Pickles said that already capital works to the value of nearly £2,000,000 had been completed. They estimated that in the next four years capital works costing £3,000,000 annually would be undertaken, subject to the provision of the necessary materials and labour. The Board was endeavouring to place as much of the work of plant manufacture as possible with Scottish firms, and contracts had already been entered with them to the value of over £1,000,000. It was hoped that the 25,000 consumers still using d.c. would be switched over to a.c. within seven years.

Electricity Output

The Ministry of Fuel and Power statement for the week ended 1st April shows that 922.8 million kWh was sent out for public supply from solid fuel-fired stations, as compared with 894.3 million kWh in the preceding week, and 713.3 for the week ended 2nd April, 1948. Stocks of coal at electricity undertakings at 2nd April totalled 3,250,000 tons.

Large New Zealand Project

The site chosen for the Roxburgh hydro-electric power project, which will be the largest in the Dominion, was announced recently by the New Zealand Minister of Works (the Hon. R. Semple). The capacity will be more than 300,000 kW. The dam and power house will be five miles upstream from Roxburgh on the Clutha River, a short distance above the mouth of the Clutha Gorge. The Clutha at this point is narrow and the gorge is 700ft deep. The dam will be 180ft high and will impound a lake 18 miles in length, tapering off near Alexandra.

Submarine Transmission

The possibility of transmitting power from Tasmania to the Australian mainland is discussed by Mr. H. P. Moss in a recent issue of the Australian *Electrical Engineer and Merchandiser*. The distance between the two nearest points is about 135 miles, but by taking a longer route use could be made of various islands. Distances of over

30 miles would, however, have to be run by submarine cable at voltages of the order of 100 or 200 kV. The author concludes that by the time the necessary technical development has taken place to enable submarine transmission to be employed over such distances the local demand will have so expanded that only the less accessible resources will remain unexploited.

East Midlands Board's Guide

A useful handbook accompanied by a map of the Area has been prepared by the East Midlands Electricity Board, Mapperley Hall, Nottingham. It contains the names of members of the Board and its principal officers; a list of undertakings vested in the Board; details of the chief departments and of the sub-area organizations; and brief particulars of the Consultative Council and Division personnel.

Staff Journal

The latest B.E.A. staff journal to make its appearance is the *Beacon*, the magazine of the North Western Division. No. 1 (April) provides a diversity of literary fare, both entertaining and informative. The divisional controller, Mr. C. T. S. Arnett, O.B.E., contributes an interesting "Fireside Chat" and the contents also include a description of the working of the Manchester control room by Mr. J. R. Thompson, divisional system operation engineer.

Berwick Rural Supplies

In response to a petition from the inhabitants of ten villages in the Merse area of Berwick the Electricity Board has undertaken to provide a supply to the district before the end of 1950.

N.Z. Forecast

A report of the Electric Supply Authority Engineers' Institute of New Zealand forecasts that output of electricity in the Dominion will not have caught up with demand by 1960.

S. Rhodesian Report

The report of the Southern Rhodesian Electricity Supply Commission for 1947-48 records total sales amounting to 143.8 million kWh, an increase of 3.8 per cent on 1946-47. Actually the rate of expansion was somewhat higher than this, as a change in meter reading had the effect of shortening the revenue and output period. In the Umtali undertaking, suspension of operations by an important mining consumer caused a decline in sales. Altogether, mines used 107 million kWh, a decrease of 0.15 per cent; municipalities 17.9 million (20.44 per cent increase); industrial consumers 13.4 million (9.16 per cent increase); and rural, domestic and lighting consumers 5.4 million (32.18 per cent increase). Financially, there was an excess of costs over revenue of £43,674, making the accumulated deficit £63,606.

Blackpool Concession

The autumn illuminations at Blackpool (16th September to 24th October) extend into the period when display lighting is permitted only after 7 p.m. A request that the Corporation should be allowed to switch on the lights earlier was at first rejected by the Ministry of Fuel and Power, but the application has now been agreed to. The Corporation has been asked to arrange the times of switching on with the Area Electricity Board.

Douglas Illuminations

Proposals for restoring part of the promenade illuminations at Douglas, I.O.M., for the coming season are being considered by the Town Council.

Street Lighting Plans

Ince U.D.C. has confirmed a scheme for the installation of mercury electric-discharge lamps in Manchester Road and Warrington Road at an estimated cost of £6,142.

The estimates of Lambeth Borough Council include provision for the conversion of street lighting from gas to electricity.

The Ministry of Health has approved the Gateshead Council's plan to provide electric street lighting from Carr Hill Road to the Team Valley Trading Estate. The cost will be over £6,000.

Electrical Installations

The Ministry of Health has informed the Billingham-on-Tees U.D.C. that there is no objection in principle to the installation of electricity in all houses on the Cowpen Lane and Belasis Lane estates. The North-Eastern Electricity Board is being asked by the Council to supply a specification for the work and tenders will be invited.

South African Extensions

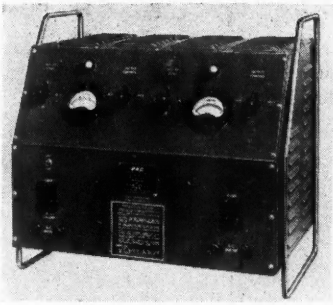
The rapidly increasing demand for electricity in Grahamstown has compelled the City Council to restrict the sale of electrical appliances in certain areas. Some time ago the Council asked the Electricity Supply Commission to take over the generating plant and equipment but the Commission stated that it would not give effect to this proposal before early in 1950, and recommended the Council to proceed with extensions in the meantime. The Council has, therefore authorized the city electrical engineer to prepare drawings, estimates, etc., for an extension to the power station.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

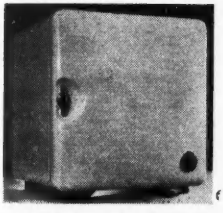
Industrial Battery Chargers

A COMPREHENSIVE series of industrial chargers employing selenium metal rectifiers for use in garages and electrical workshops is introduced by the GENERAL



G.E.C. industrial battery charger

ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. The range comprises seven models, including one, two and three circuit units, which can be offered with outputs of from 5 to 20 A, 2 to 8A and 2 to 8 A respectively. Although the case sizes vary according to the capacity of the unit, the general arrangement of each charger is similar for all three types.



Astral 1½ cu ft refrigerator

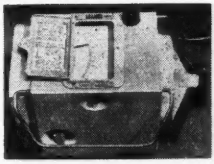
Refrigerator for Small Kitchens

People whose kitchens are of small dimensions particularly, will welcome a 1½ cu ft refrigerator brought out by **Astral Equipment, Ltd.**, 146, Buchanan St., Glasgow. Measuring only 22½in by 22in by 21¼in and weighing less than 60lb, it can be mounted on a wall if required. The machine operates on the absorption principle and accordingly has no motor or other moving parts requiring attention. Aluminium is used for the construction of the cabinet. The selling price is £29 15s, plus £7 14s 8d purchase tax.

Earth Impedance Tester

The impedance of a complete earthing circuit, which includes the resistance to earth of the earth electrodes at both the consumer's premises and the substation, can be measured by the "Megger Earthometer" tester made by EVERSHED & VIGNOLES, LTD., Acton Lane Works, Chiswick, London, W.4. It can also be used in the same way as the well-known "Megger" earth tester for measuring the resistance to earth of individual earth electrodes. As tests are carried out with the circuit alive, a neon lamp live line detector is incorporated. This instrument is a development from a mains operated one originally designed and marketed by A. Reyrolle & Co. and com-

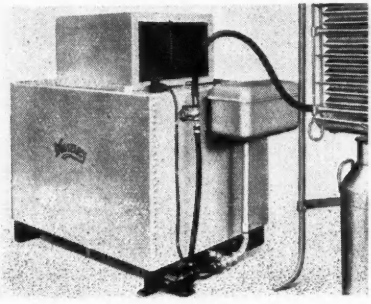
"Megger Earthometer" tester



prises the usual ohmmeter and hand-driven generator mounted together in a cast aluminium case.

Milk-cooling Unit

A new milk cooler made by the WOLSELEY SHEEP SHEARING MACHINE CO., LTD., Electric Avenue, Birmingham, 6, chills the water for cooling the milk between the milking operations. The refrigerating unit thus runs over a period of about seven hours instead of only when the milk is being cooled. This means that a much smaller unit can be used. The unit holds 75 gall of water which can be chilled from 60 deg F down to 34 deg F in the seven-hour period. The capacity of the unit can be increased by up to 50 per cent by the use of a double or two-stage "Turbulent" cooler instead of the standard cooler unit. For a day's operation about

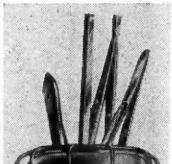


Wolseley chilled water milk-cooling unit

five units of electricity are used. The price without cooler is £160.

Dry Sterilizer

A dry sterilizer made by H. FISHER (OLDHAM), LTD., Glodwick Road, Oldham, provides doctors, dentists, etc., with a safe, portable, quick and easy method of sterilizing instruments, which are treated simply by placing them in a vessel of heated granules. The apparatus consists of a heat-insulated and hygienic case and a small, chromium-plated inner vessel containing specially prepared heat accumulating glass beads. These



Fisher dry sterilizer

are uniformly heated by a metal-clad element arranged around the periphery of the vessel. The temperature is controlled by a small thermostat and a pilot light shows when the heating element is operating.

Oven for Aircraft

With the addition of a new 1½ kW model to its range of air circulation ovens, the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, has

G.E.C. oven for heating frozen food on aircraft

made available facilities for airborne catering with pre-cooked frozen food. The new oven supplies eight two-course cooked meals in 39 minutes. Frozen food is placed in containers and heated by sheathed-wire elements over which air is circulated by a motor-driven fan. The oven is designed for use on 24-V supplies, the elements taking 1,500 W and the motor 216 W.

Separate switches with individual indicator lights control the elements and the motor, while a hand-set timing switch causes the whole equipment to be switched off after a selected period, at the same time sounding a bell. Overheating is guarded against by a thermostat. The standard finish for this oven is stoved cream enamel, but other colours are available.

Rapid Water Heater

The "Hotentot" instantaneous electric water heater introduced by the CAMPBELL ENGINEERING CO., LTD., Sherman Works, Bromley, has an output of one gallon at 135 deg F in 5 minutes on "hot" or one pint of boiling water in 75 seconds. The overall dimensions are 17in high and 4½in diameter, the weight being 12lb. The outer casing is stove enamelled in cream. The top bakelite cap forms the controlling switch. By turning the cap to the "hot" position, the electricity is switched on and simultaneously the water inlet valve is depressed. In the "boiling" position a similar action takes place with a reduced water feed.

The water enters the head of the heater through a stabilizer valve which re-

"Hotentot" water heater

duces the pressure of water from the mains to 20lb. It is then divided, and circulates over two U-shaped embedded elements, each of 1½ kW loading. These elements are encased in non-corrosive tungum tubes. The heated water returns to the "head" of the heater where it emerges through a central outlet pipe connecting to a swivel pipe over the sink. A bi-metal safety cut-out is provided. The retail price is £10 17s 7d plus £6 10s 3d purchase tax.

Plug-in Motor Control

A new plug-in type motor control and switch gear brought out by E.G.A. ELECTRIC, LTD., Holyhead Road, Wednesbury, greatly facilitates maintenance and speedy replacements. The isolator and fuses are mounted on the lid of the unit, the pulling

out of the isolator and the undoing of four screws enabling the contactor unit to be removed without interfering with any wiring. Sixteen different types of gear cover a wide variety of requirements. A point of interest regarding the construction is that all the 84 screws in each unit are identical.

Hair Dryers

A streamlined hair dryer produced by H. FISHER (OLDHAM), LTD., Glodwick Road, Oldham, is claimed to give a current of air over a much wider area than the ordinary gun-shaped models. The body is of a durable heavy-gauge metal. Two switches (for hot and cold air) are incorporated in the plastic handle.

"Dudley electric" hair dryer

The "Dudley Electric" hair dryer made by the CO-OPERATIVE WHOLESALE SOCIETY, National Works, Hall Street, Dudley, has a wholly insulated white moulded streamlined body with a comfortable hand grip in dark brown. The element is loaded at 400 W and the universal motor at 50 W. Switches for "on" and "off" and for hot or cold air are incorporated in the handle. The apparatus weighs 36oz.

Colour Matching Unit

A unit developed for critical colour matching in industry is introduced by SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38 and 39, Upper Thames Street, London, E.C.4. The principle underlying the design is that by an additive mixture of the light from incandescent filament lamps and blue fluorescent lamps an "artificial daylight" having a spectral distribution approximating closely to that of natural daylight at any desired colour temperature can be obtained. This unit gives artificial daylight of a colour temperature of about 6,500 deg K and allows the examination of samples at illumination levels of 20 to 50 lumens/ft^2.

Four-pint Kettle

Trouble-free operation, an easily kept-clean body and a modern appearance have been the main objectives in view in designing the new 4-pint "Raydex Cleanline" electric kettle brought out by FALK STADELMAN & CO., LTD., 89-93, Farringdon Road, London, E.C.1. The 1,500-W element is of the immersion type, and the incorporation of a self-resetting safety device renders the apparatus suitable for a.c. only. The body is of copper, chromium plated. A very large lid facilitates filling and a non-drip spout ensures easy pouring. The price is 69s 6d.

"Raydex Cleanline" kettle

Improved Cleaner

Several improvements have recently been incorporated in the "Bustler" vacuum cleaner made by VACUUMS, LTD., Aldridge Road, Birmingham. To simplify dust removal the bag has been modified and a slide with quick-action spring clip employed.

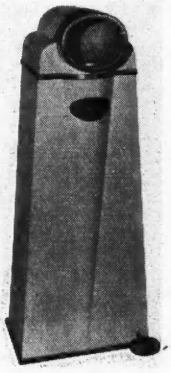
Domestic Mixing Machine

Whipping, beating, mixing and blending are possible with the 1½ quart "Junior" domestic mixing machine supplied by SELYAC DISTRIBUTORS, LTD., Forde Road, Newton Abbot. Potato peeling and vegetable washing can also be carried out with the aid of an attachment. Of pleasing appearance, it measures 12in high by 13in long and 8½in wide and weighs 16lb, excluding peeling attachment. The price is £27 19s 8d, including purchase tax.

"Selyac Junior" mixing machine

Hand Dryer

The "Handy-Andy" hand dryer, made by QUIZ ELECTRICS, LTD., 160, High St., Teddington, dries hands in 15-25 seconds with an electrical consumption of 1 kWh for every 75 operations. A specially designed 2½ kW element is suspended on a triangular frame. A foot-operated model for a.c. costs 20gn and for d.c. 21 gn, a coin-operated machine being 5gn more.



"Handy-Andy" hand dryer

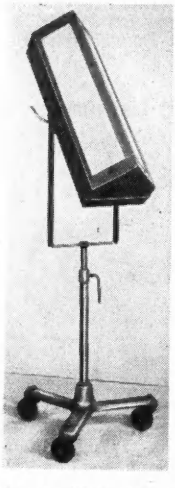
Fuse Units

It is announced that a 15 A fuse unit is now being made by H. M. BIRCHALL, 3,

Moreton Terrace, Great Moreton, nr. Congleton, Cheshire. The body is cream glazed vitreous porcelain, the carrier contacts 18 s.w.g. by $\frac{5}{8}$in hard phosphor bronze and the base contacts $\frac{3}{8}$in by $\frac{5}{8}$in by $\frac{1}{4}$in brass; all screws and washers are brass.

Mobile Floodlight

The "Orion" mobile floodlight incorporating two 2ft 40W fluorescent tubes offered by SAXON COMPONENTS, LTD., 66, Victoria Street, London S.W.1, is primarily intended



"Orion" mobile floodlight

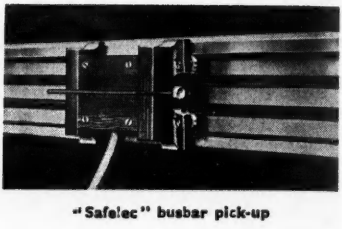
for garage and workshop use. The "Perspex" front cover provides efficient distribution of light with adequate protection from oil and moisture. It is mounted on an 18in telescopic stand with ball bearing 3in rubber-tyred wheels and trunnion support and may be adjusted to suit a diversity of requirements.

Automatic Testing

With the aid of an automatic test rig brought out by ELECTRICAL & GENERAL ACCESSORIES (LEICESTER), Ltd., Holyhead Road, Wednesbury, it is possible for an unskilled operator to test all types of electrical switchgear, domestic appliances, etc. As each test is passed an indicator lights up to show the circuit under test. In the event of a fault the apparatus immediately illuminates a numbered indicator showing where and what the fault is. When the unit being tested has passed all the tests satisfactorily a buzzer rings and the apparatus automatically switches itself off. When the unit is removed the apparatus automatically adjusts itself ready to test the next unit. Appliances can be tested at the rate of 500 an hour and larger equipment such as motor control gear at the rate of approximately 60 an hour.

Busbar Pick-up

The trolley pick-up is one of the safest and most serviceable ways of supplying current to mobile machinery. In the "Safelec" system made by GEO. W. KING, LTD., Hitchin, Herts, the small trolley moves on ball-bearing wheels which engage in "C"-shaped ducting, and the brushes collect from sunken contact strips. The rails and strips are encased in plastic mouldings made in 8ft lengths, straight or curved, joined by a simple slide arrangement which



"Safelec" busbar pick-up

ensures positive electrical connections. The track is mounted vertically alongside the overhead rails of the crane, and the trolley is towed by a chain clipped to a steel horse. The trolley itself is fabricated from "Permali," a material which is manufactured by impregnating thin wood veneers with thermo-setting resins under vacuum with subsequent hot pressings.

Test Prod

The new T.P.9 test prod produced by A. F. BULGIN & CO., LTD., By-pass Road, Barking, is suitable for a.c. or d.c. supplies of 200 V upwards. Safe, foolproof and almost indestructible, it tests for oscillation, leaks, polarity, blown fuses and continuity, and checks components and circuits. The prod is fully shrouded in rubber and has p.v.c. shrouded semi-flexible prod-leads with ferruled tips. The actual neon bulb, which is a standard proprietary lamp, is easily replaceable in the m.b.c. (B.S.52) socket. The unit is extremely sensitive and will show a leak through many megohms.

Double Triode

A double triode valve type ECC33 introduced by MULLARD ELECTRONIC PRODUCTS, LTD., Century House, Shaftesbury Avenue, London, W.C.2, is primarily intended for use in industrial electronic equipment. It combines medium/low anode resistance, high working current, high slope and low heater current, making it ideal for an unusually large number of functions. The series arrangement of heaters, which effects a 33$\frac{1}{3}$ per cent saving in current, facilitates the construction of equipment which shuts down to "safe" upon failure. The small "GT" bulb is also of great importance in the design of compact equipments. The characteristics of the valve are suitable for such applications as counting, scaling, multivibrators, "flip-flop" circuits, relay operation, timing, photocell amplifiers, etc.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Ericsson Telephones, Ltd.—In the course of his speech at the recent annual meeting Sir Harold Wernher (chairman), said that their output last year was a record and considerably over half of their total production was shipped abroad. The demand from overseas continued satisfactorily, although there was evidence of keener competition. Referring to the importance of research, Sir Harold said that in the telecommunications industry to-day this was more than ever vital, and they had continued their plans to build up their research organization on sound economic principles. During the past year they had been entrusted by the Government with a number of research contracts. Most of their departments dealing with time recorders, electric totalizators, specialized paints and varnishes, burglar alarms, etc., were busy during the year.

The British Oxygen Co., Ltd., reports a net profit for 1948 of £960,631, after charging £488,124 for depreciation, £756,244 for income tax and £342,440 for profits tax. The consolidated figures for 1948 show a net profit of £1,307,994 (against £1,020,372). The final ordinary dividend is 12 per cent, making 20 per cent for the year (unchanged).

A. Reyrolle & Co., Ltd., report a net profit for 1948 of £303,381, as compared with £129,922 for 1947. The final ordinary dividend is 7½ per cent, maintaining the distribution for the year at 12½ per cent.

The Power Securities Corporation, Ltd., reports a net profit, after tax, of £91,174, as compared with £62,124 for the preceding year. The ordinary dividend for the year is unchanged at 6 per cent.

McMichael Radio, Ltd., reports a trading profit for 1948 of £58,038, as compared with £71,468 for 1947, plus other income making £59,407. The year's net profit is £26,216 (against £35,353), plus surplus provision for taxation in previous years of £3,371. The ordinary dividend is unchanged at 8 per cent, stock and purchase tax reserve receives £14,000, and general reserve £2,160. The balance carried forward is £17,736 (against £23,699 brought in).

Glenfield & Kennedy, Ltd., report a consolidated net profit for the period ended 31st December last of £221,290, as compared with £172,185 for the preceding year. The profit combines the trading results of the parent company and of two minor subsidiaries for nine months, and of three major subsidiaries for the full year, as compared with the full year's results for each company in the previous accounts to 31st March, 1948. The final ordinary dividend is 15 per cent, making 20 per cent (against a dividend of 10 per cent and a bonus of 10 per cent). A sum of £90,036 is retained in subsidiaries, plant replacement and contingencies reserve receives £30,000, and general reserve £15,000. The balance carried forward is £52,741 (against £49,956 brought in).

Sangamo Weston, Ltd., is maintaining its dividend for the year at 17½ per cent.

New Companies

T. Adams & Co., Ltd.—Registered 22nd March. Capital £1,000. Electrical contractors, etc. Directors: T. W. C. Adams, D. Ettridge, Rose A. Adams and S. C. Perrins.

J. A. Halpin & Sons, Ltd.—Registered 23rd March. Capital £4,000. Manufacturers and repairers and agents for the sale of and dealers in artificial lighting apparatus, electrical plant, television and radio sets, etc. Directors: J. A. Halpin, B. G. Halpin and J. A. Halpin. Regd. office: 34, Carlton Crescent, Southampton.

Clyde Electric Installations (Manchester), Ltd.—Registered 24th March. Capital £2,000. To acquire the business of a radio and electrical engineer and general contractor carried on by R. J. Wright at Fallowfield, Manchester, as Clyde Electric, Ltd. Directors: R. J. Wright and L. Backhouse. Regd. office: 2, Kings Parade, Wilmslow Road, Fallowfield, Manchester, 14.

E. A. Bundle, Ltd.—Registered 24th March. Capital £2,000. Manufacturers of and dealers in electrical and mechanical apparatus, accessories and components, particularly radio sets and valves, etc. Subscribers: E. A. Bundle, 61, Sheringham Avenue, N.14, and D. Israel, 3, Dyers Buildings, Holborn, E.C.1.

Godley Services, Ltd.—Registered 24th March. Capital £500. Manufacturers of and dealers in and providers of services in connection with radio and television receivers and equipment, radio, television and electrical engineers, etc. Directors: H. Benjamin and G. E. Perrott. Regd. office: 9, Drapers Gardens, Throgmorton Avenue, E.C.2.

Premier Electrics (Harrow), Ltd.—Registered 31st March. Capital £6,000. To acquire the business of an electrical retailer,

now carried on at 158, Pinner Road, Harrow, by J. C. Hunt, as Premier Electrics. Subscribers: J. C. Hunt and M. W. Wilson. Solicitors: F. W. Perkins & Co., 39, Margaret Street, W.1.

Gee Bros. (Radio), Ltd.—Registered 31st March. Capital £100. Retail and wholesale dealers in wireless and television sets, etc. Directors: S. Goldstein, M. A. Goldstein and L. Goldstein. Regd. office: 15, Little Newport Street, W.C.2.

Channel Conduits (1949), Ltd.—Registered 2nd April. Capital £5,000. To acquire the business of Channel Conduits, Ltd. (in liquidation) carried on by A. E. A. Wright and C. R. Tallon, and to carry on the business of manufacturers, wholesalers and retailers of electrical conduits, fittings, etc. Directors: C. R. Tallon, A. E. A. Wright, R. J. Shaw, M. Tallon, and R. F. M. Wilkinson. Regd. office: 11, Victoria Street, S.W.1.

Western Industrial Agencies (Bath), Ltd.—Registered 2nd April. Capital £5,000. Manufacturers' agents and factors for general and scientific electrical equipment, etc. Directors: H. E. Shaxted and Kate E. Shaxted. Regd. office: 11-13, Railway Street, Bath.

R. Hutcheon Duthie & Son, Ltd.—Registered 1st April. Capital £5,000. Electrical engineers and contractors, etc. Directors: R. H. Duthie, Mary S. Duthie, H. A. Merchant and B. B. Duthie. Regd. office: 107, Marsh Road, Pinner, Middx.

Oldham Electrical Co., Ltd.—Registered 25th March. Capital £1,000. Directors: E. Rogers and R. Chadwick. Regd. office: 85-7, Manchester Street, Oldham.

Increase of Capital

Wright Electric Motors (Halifax), Ltd.—Increased by £12,000, in £1 ordinary shares, beyond the registered capital of £12,000.

Liquidations

Victoria Falls & Transvaal Power Co., Ltd.—Special resolution, pursuant to the Companies Ordinance, 1895, Section 64, passed 16th March, 1949. Winding up voluntarily. Liquidators, Messrs. H. A. Benson and J. F. Shearer, of Cooper Brothers & Co., 14, George Street, Mansion House, London, E.C.4.

Bankruptcies

N. H. Green, 66, London Road, Coalville, Leics, electrician.—First meeting 20th April at the Official Receiver's Office, 22, Regent Street, Park Row, Nottingham. Public examination 11th May at the County Court, 165, Station Street, Burton-on-Trent.

W. E Williams, 5B, Winchester Street, Salisbury, electrical and radio engineer.—Trustee, Mr. A. L. Medcalf, 52, Fisherton Street, Salisbury, Official Receiver, released 30th March, 1949.

T. Williams, residing at Wilholme, Lucknow Road, Short Heath, Willenhall, Staffs, electrical engineer, and trading in co-partnership with G. Williams, now deceased, at 31A, Walsall Road, Willenhall, and 2, Lower Lichfield Street, Willenhall, under the style of Geo. Williams and Son, electrical engineers and contractors.—Trustee, Mr. R. K. Clark, Somerset House, 37, Temple Street, Birmingham, 2, Official Receiver, released 30th March, 1949.

A. H. Banwell, residing at 32, New Fosseway Road, Knowle, Bristol, and carrying on business at 4, Dominion Road, Fishponds, Bristol, as electrical and radio retailer.—Trustee, Mr. P. W. Hort, 28, Baldwin Street, Bristol, 1, appointed 31st March, 1949.

L. A. R. Batchelor, 25, Eversley Road, St. Leonards-on-Sea, trading as Kenex Distributors at 139, Bohemia Road, St. Leonards-on-Sea, electrical and radio equipment wholesalers, formerly at 3, Mercatoria, St. Leonards-on-Sea, and 72, High Street, Hastings.—Trustee, Mr A. E. Orbell, 6 and 7, Old Steine, Brighton, appointed 6th April, 1949.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 6th April:—

TILLING-STEVENS.— No. 645,451. Class 7. Electric motors (not for land vehicles) and electric generators, and parts thereof included in Class 7.—Tillings-Stevens, Ltd., Victoria Works, Maidstone, Kent.

BURGESS MICRO-SWITCH.—No. B628,867. Class 9. Snap-action electric switches.—Burgess Products Co., Ltd., Brookfield Road, Hinckley, Leics.

WAFER.—No. 663,141. Class 9. Electro-acoustic and electro-mechanical transducer units for the recording or reproduction of sound.—Truvox Engineering Co., Ltd., Truvox House, Exhibition Grounds, Wembley, Middx.

MUTRON.—No. 670,045. Class 9. Electrical apparatus and instruments included in Class 9. Wireless sets (complete); scientific and surveying apparatus and instruments; photographic, cinematographic, measuring and signalling instruments; and apparatus for locating insulation and cable faults in electric circuits.—Mutron, Ltd., 40, Castle Street, Edinburgh, 2.

THOR.—No. 667,438. Class 11. Lighting installations, and parts thereof included in Class 11.—The Concordia Electric Safety Lamp Co., Ltd., Luma Works, Sanatorium Road, Cardiff.

PRINCESS.—No. 669,385. Class 11. Refrigerating apparatus and parts thereof included in Class 11.—Coldair, Ltd., Magnet House, Kingsway, London, W.C.2.

STOCKS and SHARES

NOW that the Budget is no longer an immediate factor of consequence to Stock Exchange markets, one of the handicaps to financial business should, at any rate, be no longer effective. In a few directions, the Budget proposals brought about sharp rises, notably in such cases as those where bonus issues are thought likely to be encouraged by the removal of the previous duty. The double "wear-and-tear" allowance on new plant brought "heavy" shares into greater favour. On the whole, however, the Budget led to many more falls in prices than rises.

Week's Prices

Reyrolle shares at 61s 9d. are 1s 9d higher on the excellent report showing that the net profit advanced by no less than £173,459, the dividend, however, being retained at 12½ per cent, the same as that paid for many years. Other shares to show improvement were Murex 91s 3d, Tube Investments 6½, Westinghouse Brake 67s 6d and International Combustion 45s. Ericsson 45s, are 3s up. British Insulated Callender's show a rise of 1s 6d at 33s 6d. Indian industrials are better on the attitude towards foreign capital defined by the Government of India. Cable & Wireless ordinary is 4 points higher at 230½; Anglo-American deferred, 3 up, is 17½. Gains of 6d made Crompton Parkinson 25s 6d and Telegraph Construction 46s 3d.

Bonus Tax Ends

Vickers 10s ordinary shares rose about half-a-crown to 33s in anticipation, and subsequent confirmation, of the removal of the tax on bonus issues. The shares responded because of the company's known desire to restore them to their former par value of £1, and because the earnings position would apparently support a more liberal dividend policy. While dividend limitation remains, the value of a free capital bonus is recognized as nominal: but investment is evidently prepared in special cases to take a view beyond it. Since the tax fell also on the bonus element in, for instance, an offer to shareholders of new shares below the market price, its abolition will assist materially over a much wider field, in the raising of fresh capital.

Lancashire Dynamo & Crypto

This company's annual accounts have been delayed by the work involved in preparing consolidated accounts: the meeting, normally held about this week, will not be called until next month. Meanwhile a second interim of 17½ per cent has been declared in place of a final dividend, and again makes a total of 22½ per cent for the year. According to a preliminary statement, profits for the company's fiftieth year were approximately £130,000, after tax (against £104,125 previously). These would cover the dividend on the £480,000 ordinary capital more than twice over, and they relate, presumably, only to the parent's accounts. The present price of £5¼ for the ordinary shares is 5s below this year's best, and affords a yield a 4¼ per cent.

Lighting Up

Lighted shop windows and advertisements after dark have been reflected in a little inquiry for shares connected with their reappearance. Franco Signs 5s shares attracted attention, rising to 11s 6d. They have fluctuated previously this year between 7s 6d and 11s. The last dividend, for the year ended March, 1948, was 5 per cent. This was paid largely from reserves, and was half the rate of the four previous payments. In his review nearly a year ago, the chairman referred to distinct signs of improvement in trading results. Strand Electric Holdings 5s shares have hardened to 10s 6d, at which they show a return of £8 6s 8d per cent on the 17½ per cent dividend.

Preference Shares

It still remains difficult to obtain much more than 3¾ per cent on money invested in the popular front-rank preference shares. The G.E.C.'s three preference issues, for instance, all give a return within 1s of that rate, while B.I.C. 5½ and 6 per cents, on offer respectively at 29s 6d and 32s 6d, pay a little less. Henley's 4½ per cent preference at 25s give only £3 12s per cent. Among the 4 per cent issues, Reyrolles are available at 21s 9d and Siemens at 22s. Four-per cent is to be obtained from Hackbridge Cable 5 per cent and General Cable 10s 6d per cent preference shares at 25s and 15s respectively. On Brush Electrical 5½ per cents at 18s 9d the return is £5 17s 6d per cent.

High Yields

The fall in the price of Aron Electricity Meter ordinary shares to 42s 6d has given the shares an interest for investment which looks for a fairly high yield and is willing to take what risks this may imply. At 42s 6d, Aron Meter yield £7 1s per cent on last year's dividend of 15 per cent. The dividend is distributed once a year, usually in June, and last year's 15 per cent came from earnings of twice that amount. Another high-yielding ordinary share is Newman Industries, the florin shares of which can be bought at 5s 6d, to give £8 3s 8d on the present paid 22½ per cent dividend.

Swiss Export Trade

FURTHER INCREASE IN 1948

ACCORDING to the official statistics of Swiss foreign trade recently issued in Berne for the year 1948, exports of electrical goods as a whole continued the steady advance which has been noticeable since 1945.

The values of the principal groups are shown in the accompanying table together with notes of increases or decreases (very few) compared with 1947. It will be seen that nearly all the leading groups shared in the advance, radio apparatus being the only noteworthy exception; in this line, Switzerland is still a larger importer than exporter. She has evidently strengthened her hold on a large number of markets. The exchange rate for the Swiss franc is approximately seventeen to the £.

Class of Goods and Destinations	1948 Sw. fcs. (000)	Inc. or dec. on 1947 Sw. fcs. (000)
Accumulators	1,623	+ 546
To Argentina	143	− 179
„ *Belgium*	164	+ 22
„ *Spain*	107	+ 96
„ *Holland*	189	+ 75
Insulators	964	+ 221
To Czechoslovakia	31	− 86
„ *Holland*	308	+ 236
„ *France*	31	+ 21
„ *Italy*	24	− 32
„ *Spain*	29	+ 2
„ *Norway*	135	− 40
„ *Finland*	145	+ 126
Meters and measuring instruments	25,732	+ 6,948
To Belgium	2,997	+ 1,291
„ *Sweden*	2,367	− 407
„ *Czechoslovakia*	1,175	− 95
„ *Argentina*	3,329	+ 1,400
„ *Holland*	3,419	+ 801
„ *France*	1,612	+ 424
„ *Italy*	1,780	+ 551
Glass rectifiers with or without mercury	24	+ 10
To Poland	11	+ 11
Telegraph and telephone apparatus	9,983	+ 4,488
To Italy	482	+ 182
„ *France*	376	+ 339
„ *Belgium*	606	+ 153
„ *Brazil*	316	+ 114
„ *Holland*	5,824	+ 2,747
Radio apparatus	7,198	− 1,981
To Yugoslavia	685	− 576
„ *Belgium*	442	− 322
„ *Sweden*	496	− 149
„ *Czechoslovakia*	537	− 620
„ *South Africa*	465	− 238
„ *Brazil*	635	− 320
Dynamo-electric machines	61,658	+ 13,158
To France	307	− 3,287
„ *Britain*	255	+ 169
„ *Czechoslovakia*	246	+ 68
„ *Belgium*	358	− 3,665
„ *Holland*	206	− 4,082
„ *Argentina*	697	− 1,031
„ *Brazil*	572	− 2,832
„ *Turkey*	786	+ 228
„ *India*	477	− 134
Insulated wire and cable	4,107	+ 1,929
To Germany	288	+ 288
„ *Sweden*	393	− 67
„ *Belgium*	767	+ 422
„ *Czechoslovakia*	221	− 5
„ *France*	889	+ 327
Electric incandescent lamps	733	− 664
To Austria	170	− 32

Class of Goods and Destinations	1948 Sw. fcs. (000)	Inc. or dec. on 1947 Sw. fcs. (000)
Unspecified elec. apparatus over 500 kg	12,973	+ 8,369
To Holland	704	+ 627
„ *Spain*	2,963	+ 1,683
„ *Sweden*	1,337	+ 727
„ *Turkey*	202	+ 156
„ *Brazil*	353	+ 133
„ *Canada*	946	+ 946
„ *Colombia*	553	+ 409
Ditto, 50 to 500 kg	10,470	+ 3,658
To Belgium	846	+ 356
„ *Holland*	1,376	+ 316
„ *Spain*	554	− 53
„ *Turkey*	228	+ 180
„ *Sweden*	984	+ 91
„ *Brazil*	703	+ 227
„ *Finland*	524	+ 515
Ditto 3 to 50 kg.	14,698	+ 5,314
To France	1,248	+ 444
„ *Belgium*	930	− 38
„ *Holland*	1,470	+ 2
„ *Sweden*	928	+ 314
Locos (mainly to Holland)	3,542	+ 2,393

Public Transport Association

THE seventh annual general meeting of the Public Transport Association Inc. is to be held at the Royal Hall, Harrogate, on Wednesday, 4th May. In its report for the past year the Council records that at the end of 1948 the membership of the Association totalled 454, comprising 122 company operators, 34 municipal operators, 163 contractors and 120 associate, 11 overseas, 2 extra-ordinary and 2 honorary members. The number of public passenger transport vehicles owned by members (other than overseas) was 48,455.

Representations were made during the year on a number of matters including the permitted length of single-deck vehicles; production of new vehicles; and radio suppression. On the last-named question it was urged that the cost of installing suppression devices should not in equity fall on operators whose equipment, at the date of introduction, fully complied with all statutory requirements.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1944

9819. British Thomson-Houston Co., Ltd. (General Electric Co.).—Electromagnetic control apparatus. 22nd May, 1944. (620297.)

10629. Western Electric Co., Inc.—Ionic-discharge devices. 8th September, 1943. (620475.)

1945

1107. British Thomson-Houston Co., Ltd., Woodfield, T. H., and Morton, C. J.—Fitting of ball bearings. 15th January, 1945. (620566.)

1421. Budd Induction Heating, Inc.—Apparatus for quenching heat treated articles. 21st November, 1941 (Divided out of 620386.) (620389.)

1626. Morgan Crucible Co., Ltd., and Hallett, C. G. H.—Arc lamps and electric welding machines. 19th January, 1945. (620299.)

3518. British Thomson-Houston Co., Ltd.—Holders for tubular electric lamps. 14th February, 1944. (620476.)

3664. Communications Patents, Ltd., and Rogers, E. W.—High-frequency electric wave heating apparatus. 14th February, 1945. (620300.)

3669. British Thomson-Houston Co., Ltd.—Vibration pick-ups. 18th February, 1944. (620301.)

19102. Rust, N. M., and Partington, G. E.—Radio-location and detection arrangements. 25th July, 1945. (620568).

21664. O'Brien, W. J.—Radio navigation systems. 23rd August, 1945. (620479.)

21665. O'Brien, W. J.—Coil constructions for goniometers and the like. 23rd August, 1945. (620480.)

21690. O'Brien, W. J.—Radio frequency receiving apparatus. 24th August, 1945. (620481.)

23124. Westinghouse Electric International Electric Co.—Variable-speed control systems. 7th September, 1944. (620569.)

31640. Compagnie Générale d'Electricité.—Immersible repeater for submarine telephone circuits operated by carrier currents. 13th April, 1943. (620577.)

32301. Baylin, S.—Rotary power units, pumps and compressors. 29th November, 1945. (620392.)

32733. Standard Telephones & Cables, Ltd., and Childs, P. A.—Electrical time measurement. 4th December, 1945. (620393.)

32734. Standard Telephones & Cables Ltd., and Childs, P. A.—Electric signal responsive circuits. 4th December, 1945. (620394.)

33647. General Electric Co., Ltd., and Turrall, J. C.—Insulating testing arrangements for electric trolley buses. 12th Dececember, 1945. (620395.)

33901. Telephone Manufacturing Co., Ltd., Smith, S. J., and Terry, R. St. G.—Apparatus for indicating time intervals. 14th December, 1945. (620582.)

34712. Philco Radio & Television Corporation.—Ultra-high-frequency electrical transmission systems. 15th August, 1944. (620583.)

1946

3723. Decca Record Co., Ltd., and O'Brien, W. J.—Radio navigation systems. 6th February, 1946. (620487.)

3724. Decca Record Co.. Ltd., and O'Brien, W. J.—Radio direction indicating systems. 6th February, 1946. (620488.)

6081. Akt.-Ges. Brown, Boveri & Cie.—Gas producers operating in conjunction with multi-stage gas turbine plants. 27th February, 1945. (620401.)

7981. Philco Products, Inc.—Selection arrangements for electrical pulse systems. 14th March, 1945. (620585.)

9410. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Schmidt optical system. 1st July, 1941. (620404.)

11839. Stevens, A. H. (Submarine Signal Co.).—Electrical mounting stacks. 17th April, 1946. (620490.)

12180. Fekete, A. F.—Compact electric condensers. 23rd April, 1946. (620405.)

13536. Compagnie Générale de Télégraphie sans Fil.—Electron beam projectors in electron-discharge devices. 12th July, 1943. (620491.)

14168. General Electric Co., Ltd., and Stenning, L. C.—Radio beacons for aircraft. 10th May. 1946. (Cognate application 7020/47.) (620589.)

14414. Griffith, A. A.—Gas turbine power plants. 13th May, 1946. (620492.)

15054.—Decca Record Co., Ltd., and Fennessy, E.—Radio systems for enabling geographical positions to be determined and/or indicated at a receiver. 17th May, 1946. (620493.)

17266. Standard Telephones & Cables, Ltd.—Frequency modulation system. 9th June, 1945. (620591.)

18287. Whiting, J. G.—Light projectors. 18th June, 1946. (620495.)

19169. Robertson, D. R., Coe, A. E., and Brewer, A. W.—Electrical computing apparatus. 26th June, 1946. (620496.)

20628. British Thomson-Houston Co., Ltd.—Sensitive direct-current measuring apparatus. 11th July, 1945. (620595.)

20741. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Transmission and reception of telegraphic signals. 24th June, 1943. (620497.)

21224. Philips Lamps, Ltd.—Radio receivers and like electro-acoustic apparatus. 3rd September, 1942. (620411.)

22258. Marconi's Wireless Telegraph Co., Ltd.—Relaxation oscillators and multi-vibrators. 26th July, 1945. (620414.)

22825. General Electric Co., Ltd., and Rycroft, J. L.—Electric heaters. 31st July, 1946. (620499.)

23058. Cox-Cavendish Electrical Co., Ltd., and Blackshaw, A. E.—Apparatus for producing surging faradic, galvanic and sinusoidal currents. 2nd August, 1946. (620418.)

23352. Heurtey & Cie.—Metallic devices for suspending electric resistors in furnaces. 23rd June, 1944. (620598.)

23828. Standard Telephones & Cables, Ltd., Robinson, G. B., and Eadon-Clarke, C. E.—Equipment for the transmission of h.f. electric power. 12th August, 1946. (620502.)

24155. Westinghouse Electric International Co.—Electron-discharge devices. 14th August, 1945. (620312.)

24303. Metropolitan-Vickers Electrical Co., Ltd., and Scoles, G. J.—Electrical calculating circuits. 15th August, 1946. (620503.)

24988. O'Brien, W. J.—Phase discriminator circuits. 24th August, 1945. (Divided out of the 620481.) (620507.)

24989.—O'Brien, W. J.—Multiple channel radio receivers. 24th August, 1945. (Divided out of 620481.) (620508.)

27945. Londex, Ltd., and Stern, W. L.—Supply systems for electric-discharge lamps. 18th September, 1946. (620422.)

29123. Philips Lamps, Ltd.—Phase-modulation of carrier waves. 21st June, 1943. (620424.)

29151. Akt.-Ges. Brown, Boveri & Cie.—Automatic arc welding devices. 1st October, 1945. (620609.)

31066. General Electric Co., Ltd., Turner, H. C., and Ryan, F.—Electric lighters and the like. 18th October, 1946. (620321.)

31098. Metropolitan-Vickers Electrical Co., Ltd., and Scoles, G. J.—Electromagnetic wave guides. 18th October, 1946. (620611.)

32858. Metropolitan-Vickers Electrical Co., Ltd., and Dodds, J. M.—Cathode-ray tubes. 5th November, 1946. (620519.)

33181. Dooley, A. P.—Drilling pillar attachment for electric hand-drills, grinders and the like 7th November, 1946. (620520.)

35186. Metropolitan-Vickers Electrical Co., Ltd., Ludlow, J. H., and Bennets, H. G.—Heat treatment of strip metal by electromagnetic induction. 27th November, 1946. (620432.)

35219. Faulkner, A. W.—Radio apparatus for aircraft. 27th November 1946. (620327.)

37686. Smith Meters, Ltd., Charles, A., and Charles, J. A.—Coin holders for prepayment mechanisms for gas and electricity meters and for like purposes. 23rd December, 1946. (620528.)

1947

132. Westinghouse Electric International Co.—Electric arc devices. 27th January, 1942. (620332.)

201. Boulton Paul Aircraft, Ltd., and Batchelor, J. W.—Multiple station control systems. 3rd January, 1947. (620334.)

210. Wardle Engineering Co., Ltd., and Ogley, D. H.—Electric heaters. 3rd January, 1947. (620335.)

439. General Electric Co., Ltd., and Mainwaring, A. W.—Electric street lighting fittings. 6th January, 1947. (620338.)

655/6. General Electric Co., Ltd., and Friedlander, E. S.—Alternating-current electric motor equipments. 8th January, 1947. (620206/7.)

676. British Thomson-Houston Co., Ltd.—Automatic machines for washing clothes and like articles. 8th January, 1946. (620210.)

732. Sinclair, H., and Murphy, G. C.—Fire-alarms using an electric circuit. 9th January, 1947. (620215.)

790. Schild & Co. Soc. Anon.—Synchronous electric motor with automatic starter, in particular for electric clocks. 21st October, 1946. (620220.)

811. British Thomson-Houston Co., Ltd.—Phase shifting circuits. 9th January, 1946. (620222.)

812. British Thomson-Houston Co., Ltd.—Electric switches. 9th January, 1946. (620223.)

841. Mallory Metallurgical Products, Ltd., and Hyde, C. C.—Spot welding electrodes 10th January, 1947. (620227.)

860. Bolton & Sons, Ltd., T., Slater, W. F., Collier, T. W., and Berrisford, S.—Electric conductors and methods of manufacture thereof. 10th January, 1947. (620230.)

914. Westinghouse Electric International Co.—Control systems for gas turbine electric generator power plant. 12th January, 1946. (620234.)

920. British Thomson-Houston Co., Ltd., and Petch, T. H.—Electric motor control systems for winding engines. 10th January, 1947. (620236.)

921. British Thomson-Houston Co., Ltd., Leech, G. N., and Read, J. C.—Electric convertor systems. 10th January, 1947. (Addition to 524933.) (620346.)

922. British Thomson-Houston Co., Ltd., and Read, J. C.—Electric convertor systems. 10th January, 1947. (620347.)

940. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Aperiodic high-frequency voltmeters. 11th November, 1943. (620348.)

972. Standard Telephones & Cables, Ltd., Warden, F. W., Hellier, W. H. M., and Towner, S. H.—Receiver units for remote switching by direct-current signals over an alternating-current supply network. 10th January, 1947. (620349.)

975. Standard Telephones & Cables, Ltd., and Coe, K. G.—Terminating blocks for multi-conductor electric cables. 10th January, 1947. (620243.)

1068. Rotax, Ltd., and Thomson, R. H.—Snap-action electric switches. 13th January, 1947. (620250.)

1081. Hackbridge & Hewittic Electric Co., Ltd., Browne, A. de M., Couson, G. S., and Jewell, B. D.—Installations of metal vapour rectifying apparatus. 13th January, 1947. (620253.)

1166. Metropolitan-Vickers Electrical Co., Ltd., and Shand, G.—Electronic timing apparatus. 13th January, 1947. (620261.)

1190. Cole, Ltd., E. K., and Knipe, A. R.—Means for making electrical connection at intermediate points in an induction coil or the like. 14th January, 1947. (620264.)

1251. General Electric Co., Ltd., and Bardell, P. R.—Magnetic dust cores. 14th January, 1947. (620269.)

1255. Westinghouse Electric International Co.—Turbine apparatus. 20th November, 1945. (620270.)

1260. Philips Lamps, Ltd.—Mixing circuits. 12th November, 1943. (620271.)

1268. Compagnie Générale d'Electricité.—Rotary switch. 12th February, 1946. (620273.)

1326. Square, D. Co.—Electric motor control systems. 29th January, 1946. (620279.)

1348. Ericsson, J. S.—Cable connector for accumulators or such like. 15th January, 1947. (620281.)

1375. Sperry Gyroscope Co., Ltd., and Sedgfield, H. B.—Wire-wound potentiometers. 15th January, 1947. (620284.)

1387. Corning Glass Works.—Manufacture of electrically conducting refractory compositions. 22nd November, 1944. (620437.)

1404. British Thomson-Houston Co., Ltd.—Holders for incandescent and fluorescent lamps. 16th January, 1946. (620289.)

1405. Brund, A., Svensson, H., and Sjodin, S.—Arrangement for electric quick-hardening of castings of structural materials. 15th January, 1947. (620356.)

1515. Scarpa, G.—Oil circuit-breakers having explosion chambers. 21st January, 1946. (Cognate application 1516/47.) (620371.)

1529/30. Mouchel & Partners, Ltd., L. G., and Richards, C. H.—Distribution of water in water-cooling towers. 16th January, 1947. (620373/4.)

1532. Smith & Sons (England), Ltd., S., and Dorer, P. O.—Casings for indicating instruments. 16th January, 1947. (620375.)

1535. British Thomson-Houston Co., Ltd.—Exhaust-driven turbo-superchargers of internal-combustion engines. 16th January, 1946. (620376.)

1536. British Thomson-Houston Co., Ltd.—Lamp-holders for circular fluorescent lamps. 16th January, 1946. (620377.)

1579. McDowell, O. A.—Thermostatically controlled electric water-heaters. 17th January, 1947. (Addition to 601843.) (620384.)

1589. Etablissements P. Sourian.—Electric plug-and-socket couplings. 4th September, 1942. (620385.)

1603. Rudd. C. H.—Electrical overload protective systems. 17th January, 1947. (620439.)

1632. Standard Telephones & Cables, Ltd., and Willis, J. G.—Radio transmitters. 17th January, 1947. (620444.)

1634. Burndept, Ltd., Richardson, R. P., and Lewis, R. W.—Primary electric cells. 17th January, 1947. (620445.)

1671. Crabtree & Co., Ltd., J. A., and Morgan, R. W.—Snap-action electric tumbler switches. 17th January, 1947. (Cognate application 9270/47.) (620452.)

1717. Combined voltage-regulators and self-closing circuit-breakers. 29th March, 1939. (620458.)

1766. McAuley, K. F.—Apparatus for charging secondary electric cells. 20th January, 1947. (620463.)

1784. Standard Telephones & Cables, Ltd., Grunwald, H. H., and Cooper, W. A. R.—Combined electrical switching and indicating equipment. 20th January, 1947. (620465.)

1792. Wheeler, H. D., and Mossay, P. A. H.—Electrical control systems for electric lift motors. 20th January, 1947. (620468.)

1924. New Day Electrical Accessories, Ltd., and Davey, L. E. W. C. N.—Electric socket contacts. 21st January, 1947. (620541.)

2087. Aircraft-Marine Products, Inc.—Electrical connectors. 20th March, 1946. (620561.)

2129. Standard Telephones & Cables, Ltd., and Towner, S. H.—Mounting electrical contact springs. 23rd January, 1947. (620616.)

2187. Turner Electrical Instruments, Ltd., E., and Peck, G. T.—Electrical plug-and-socket connectors. 23rd January, 1947. (620624.)

2210. Sunbeam Commercial Vehicles, Ltd., and Dabbs, J. C.—Electrically driven vehicles. 24th January, 1947. (620627.)

2282. Standard Telephones & Cables, Ltd., and Terry, V. J.—Telegraph relays. 24th January, 1947. (620633.)

2339. Holophane, Ltd. (Soc. Anon. Holophane).—Light-controlling devices. 24th January, 1947. (620639.)

Amended Specification

603650. Coley Electrical Instruments, Ltd., and others. Electrical contact devices for use in pressure operated instruments.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—31st May. Directorate of Argentine State Oilfields Department. Transformer and distribution sub-station. (C.R.E. (I.B.) 9960/49. Ten/351.)*

Edinburgh.—North of Scotland Hydro-Electric Board. Electric lighting and heating services for switching station and plant house at Errochty. (8th April.)

India.—BOMBAY.—16th May. Controller of Stores, Bombay Port Trust. Electric pumping sets, water coolers, and portable dual-voltage motor generator set. (C.R.E. (I.B.) 8818/49. Ten/334.)*

London.—6th June. British Electricity Authority. Experimental 100kW wind-driven generator. (8th April.)

North Riding.—29th April. Education Committee. Installation of electric lighting at St. Thomas's C.E. School, Scarborough. F. Barraclough, secretary, County Hall, Northallerton.

Northumberland.—Education Committee. Electrical installation (lighting and radio points) in Newbiggin East C.E. School. County architect, County Hall, Newcastle-on-Tyne.

Southport.—2nd May. Education Committee. Electric wiring installation and supply and fixing of fittings, in proposed Churchtown school, Marshside Road. H. D. Dodd, borough schools architect, Town Hall.

Sutton Coldfield.—23rd April. Corporation. Amplifying equipment for the Town Hall and Council House. (See this issue.)

Uruguay.—MONTEVIDEO.—23rd May. Administracion General de Las Usinas Electricas y las Telefonos del Estade. Dry cells for telephonic use. (C.R.E. (I.B.) 9389/49. Ten/339.)*

Wanstead & Woodford.—29th April. Corporation. Mercury vapour lighting. (See this issue.)

Weymouth.—19th April. Corporation. Electrical installations for housing schemes. (See this issue.) 25th April. Electrical installations in 32 flats. (8th April.)

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Hull.—Corporation Housing Committee. Electrical installations in 124 houses at Bilton Grange (£6,794). W. Marlow, Withernsea.

Liverpool.—Education Committee. Re-wiring electrical installation at Liverpool Collegiate School (£2,110).—Rawson & Harding.

Northumberland.—Education Committee. Accepted tenders for electrical work at schools. Bellingham County Mixed: Installation at extensions (£1,555) and electrical equipment (£132) —Falconar Cross & Co. Refrigerators (£298)—Mearns & Co. Electric drying cupboards (£260) —Gledson & Co. Blyth Crofton Road (additions) and Lynemouth County Primary: Electrical equipment (£185 and £323)—N.E. Electricity Board.

West Sussex.—County Education Committee. Improvements to the heating installation and the re-wiring and improvement of the electrical installation at County School of Art and Craft at Worthing:—Heating—Whades, Ltd. (£98); electrical—H. J. Galliers (£617).

Re-wiring and repairing electrical and radio installations at the County Secondary Schools at Horsham (£314)—H. & E. Lintott.

Electrical installation at Hollycombe County School, school house and canteen kitchen (£385) —R. S. Warrell.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Primary school, Cummings Park (£176,700); T. F. Henderson, city surveyor.

Bolton.—Fire station, Kay Street (£42,800); C. Herbert, borough engineer, Town Hall.

Bootle.—Dwellings (56) near Ford Station; borough engineer, Town Hall.

Cheshire.—Primary school, Timperley; E. M. Parkes, county architect, The Castle, Chester.

Chester.—Out-patients' department, Royal Infirmary; Saxon, Smith & Partners, architects, 2, Stanley Street.

Extensions to works; Will R. Rose, Ltd., Hamilton Place.

Crook (Co. Durham).—Extensions to factory of Marshall Richards, Ltd.; J. Walter Hanson & Son, 46, Northumberland Street, Newcastle.

Croydon.—Second stage of Spring Park Primary school and erection of Fairchildes Secondary Modern School; education architect, Town Hall.

Second section of Gilbert Scott Primary School; Riches & Blythin, architects, 77, Park Lane.

Dartford.—Houses (100), Temple Hill site; borough engineer.

Durham.—Two additional classrooms at Blackhall Colliery County School (£4,000); J. & C. Oliver, builders, Wingate, Co. Durham.

Ellesmere Port.—Houses (88), Stanney estate; U.D.C. surveyor, Queen Street.

Exeter.—Houses (64), Stoke Hill site; city architect.

Showrooms and offices, High Street; Montague Burton, Ltd., Hudson Road Mills, Leeds, 9.

Four health centres; H. V. de Courcy Hague, county architect, 97, Heavitree Road.

Frome.—Divisional headquarters and courts, Oakfield Road (£80,000); county architect, Park Street, Taunton.

Glasgow.—Additions and alterations to University Medical Buildings; Gillespie, Kidd & Coia, architects, 19, Waterloo Street.

Factory, Dumbarton Road; J. Houston, architect, 307, West George Street.

Glossop.—Houses (34) and flats (20), Newshaw Lane, site B; J. E. Beardshaw, architect, 14, High Street West.

Golborne.—Special school; G. Noel Hill, county architect.

Grantham.—Workshop block at Technical College for Kesteven C.C.; C. B. Metcalfe, county architect, Sleaford.

Grimsby.—Reception block at Children's Homes, Brighowgate, and prefabricated branch library at housing estate; borough engineer.

Rebuilding factory, Flour Square; Liverine, Ltd., Fraser Street.

Hartlepool.—Houses (120), West View estate; R. H. Snowball, borough engineer.

Hexham.—Twelve houses at Wylam and eight at Wall; R.D.C. surveyor.

Hull.—Factory, Stoneferry industrial estate; Brogo Products, Ltd., 40, Market Place.

Kidderminster.—Commercial garage, Glensmore; J. T. Whittle & Son, Mill Street.

Shops and flats, Birchen Coppice and Foley Park estates; borough engineer.

Leicester.—Houses (153), New Parks estate, Steins Lane estate (76) and shops with living accommodation on New Parks estate; housing architect, Municipal Offices, Charles Street.

Lincoln.—Dwellings (80), Hartsholme estate; city housing architect, Stamp End.

London.—WANDSWORTH.—Development for housing, Hopton Street, Streatham, and Strathville Road, Southfields; F. Horsfall & Partners, 4, Hillside Road, Streatham Hill, S.W.2.

LEWISHAM.—Cinema, shops and offices, Lewis Grove, Marcia Grove and Albion Way; Associated Cinema Properties, Ltd., 30, Golden Square, W.1.

ST. PANCRAS.—Flats (44), Willingham Terrace; Thomas Sibthorp, chief architect to Council, 163, Highgate Road, N.W.5.

Lowestoft.—Houses (60), Yarmouth Road; W. Tickner & Sons, Ltd., Norwich.

Manchester.—Rebuilding premises, 7, St. John Street, Deansgate, for Ellis Markendale, Ltd.; T. Beesley, architect, 912, Kingsway, East Didsbury.

Rebuilding flour mill, warehouse and silo, Trafford Park; Hovis, Ltd., 154, Grosvenor Road, London, S.W.1.

Matlock.—Central omnibus station, Bateman's Park; N. Chamberlain, surveyor, Town Hall.

Newark.—Completion of colony for mental defectives, Balderton (£275,000), for the Nottingham Area Hospital Management Committee; Bromley & Cartwright, architects, Nottingham.

Newbury.—Offices, showrooms and garages; Marchants Garages, Ltd., Greenham Road.

Newcastle (Staffs).—Primary school, Hempstalls Farm, Cross Heath (£70,000); C. J. Morton, town clerk, District Bank House, Penkhull Street.

Newcastle-on-Tyne.—Two schools on the Blakelaw estate (£260,000), additions to Raby Street Primary School (£5,000) and gymnasium at Heaton Grammar School (£5,000); city architect (education section), 31, Northumberland Road.

Bottling factory for G. Towers & Co., mineral water manufacturers; C. S. Errington, 46, Grainger Street.

Northants.—Schools at Corby, Wellingborough and Kettering; J. L. Holland, chief education officer, Education Offices, Northampton.

North Shields.—Ice-cream factory, Back Prudhoe Street, for S. C. Millar; E. M. Lawson, architect, Barras Buildings, Barras Bridge, Newcastle-on-Tyne.

Northumberland.—Homes, Dinnington, Seghill and Backworth; Northumberland Aged Mineworkers' Homes Association, Newcastle-on-Tyne.

Oldham.—Repertory theatre, Fairbottom Street, for Oldham Repertory Theatre Club, Ltd.; D. Lasdun, 25, Dawson Place, Paddington, W.2.

Ormskirk.—Houses (20), Burscough, for West Lancashire R.D.C.; J. & R. Woods (Builders), Ltd., Ormskirk, near Liverpool.

Penrith.—Cold store, Bluebell Lane; Farrin's Fisheries, Ltd., 1, Hutton Road, Grimsby.

Peterborough. — Fourteen lock-up shops, branch library and flats, Dogsthorpe-Newark estate; borough engineer.

Works extensions, Burton Street; British Braids, Ltd.

Plymouth.—Five shops and flats, Weston Mill Road, King's Tamerton; Plymouth Co-operative Society, Ltd., High Street.

Preston.—Houses (150), Ribbleton Hall estate; borough engineer, Municipal Buildings.

Rochdale.—Extensions to Roach Vale Mills, Spring Mill Walk, for Rochdale Wallpaper Printing Co.; Heywood & Ogden, architects, 1, St. Peter Street, Oldham.

Houses (150), Kirkholt estate, and 32 police houses and four garages; H. W. G. Mercer, borough surveyor, Town Hall.

St. Helens.—Houses (44), Gaskell Street; M. Ward, borough engineer, Town Hall.

Scarborough.—Houses (58), High Eastfield estate; E. Hunter (Scarborough), Ltd., builders.

Seaton Valley (Northumberland).—Houses (38), Seghill; T. W. Burgess, Urban District Council surveyor.

Sedgley.—Extensions to works; Russells, Ltd., ironfounders, Holloway Works, Lower Gornal.

Sheffield.—Factory for Disabled Persons' Employment Corporation; M. J. Gleeson, Ltd., 822, Chesterfield Road, Woodseats.

Stockport.—Houses (50), Canal Bridge Farm estate; Hugh Owen & Son, Ltd., builders, 431, Buxton Road, Great Moor.

Completion of boys' department at Oxbridge Avenue Grammar School for Durham C.C. (£86,000); G. Wimpey & Co., Ltd., builders, Jesmond, Newcastle-on-Tyne.

Surbiton.—Shops, flats and garage, Arcade Parade, Hook Road; Bryant Hobbs, architect, 15, Gt. James Street, W.C.1.

Factory, Roebuck Road; F. W. Hagyard, Dolly Farm, Brockham, Betchworth.

Swanscombe.—Houses (1,000), Park site, for U.D.C.; engineer and surveyor.

Twickenham.—Flats (56), Carpenters' Almshouses site, Hampton Road; A. S. Knolles, borough surveyor, Municipal Offices.

Warrington.—Re-wiring Town Hall; borough surveyor.

Houses (40), Clay Lane, Burtonwood, 32 at Clifford Road, Penketh, and 20 at Seymour Drive, Padgate, for R.D.C.; S. C. Oxley, surveyor, Council Offices, Museum Street.

Houses (24), Poplars Avenue estate (£27,832); W. L. Challinor, builder, 2, Brian Avenue.

Whitley 'Bay.—Hotel, junction of Earsdon Road and Sandringham Drive; S. H. Lawson, architect, Emerson Chambers, Blackett Street, Newcastle-on-Tyne .

Wimbledon.—Five blocks of three-storey flats and 12 houses, Lake Road; D. S. Taylor, architect, 24, Dean Street, W.1.